

April 2003

# **Toward an Understanding of the Role of Incentives in Enlisted Recruiting**

Peggy A. Golfin

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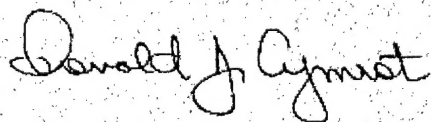


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# Summary

## Historical trends

The last half of the 1990s was a difficult period for military recruiting, and the Navy was no exception. Historically low unemployment rates and the increasing college enrollment of graduating high school seniors, among other factors, made it difficult for all of the Services to meet annual accession goals. In fact, every Service except the Marine Corps failed to meet its annual recruiting goal at least once during those years.

To counter this trend and improve its ability to meet the recruiting mission, the Navy employed numerous tools, such as increasing the cap on non-high-school-diploma graduates. This was also a time of unprecedented expansion of enlistment incentives, both in the range of ratings offering incentives and the number of recruits eligible. For instance, between FY97 and FY02, the Navy increased the budget for Enlistment Bonuses (EBs) more than 580 percent. However, the level and distribution of incentives were based on relatively little research, and what research did exist failed to account for such phenomena as the low unemployment rates during the late 1990s and other factors contributing to a decrease in the propensity of youth to enlist.

For these reasons, the Commander, Navy Recruiting Command (CNRC), and the Assistant Chief of Naval Personnel for Military Personnel Policy & Career Progression (N13), tasked CNA to investigate the effects of changes in EBs on enlistments in ratings with similar recruit qualifications. For example, if the EB offered to those in the Nuclear Field (NF) increases, what is the effect on enlistments in the program with qualifications that are the most similar to the NF, the Advanced Electronics/Computer Field (AECF)?

## **Our findings and recommendations**

Our research into the levels of EBs offered, their relationship to other monetary incentives within and across ratings, and the interaction of these offers with shipping goals led us to conclude that an accurate estimate of the effect of individual incentives on rating choice is currently not possible. In fact, we cannot determine whether the existence of a relationship between enlistments and incentives is the direct result of incentives or stems from a constellation of factors that simultaneously determine rating and ship date selection. We describe the estimation problems with using only historical data below, and provide recommendations for overcoming these difficulties in the future. We have also identified other phenomena that may not necessarily create estimation difficulties, but that we believe warrant further study because of their impact on the incentive and classification processes. We describe these issues and offer recommendations.

### **Estimation issues**

#### **Research**

The most serious data difficulty is that we do not know which ratings, ship dates, or incentives were offered to each recruit. We could work around not having direct data on offers if we could infer what offers were made based on other, observable data. However, anecdotal evidence indicates that the options offered depend on a complicated process that takes into account goals, rating, and ship date priorities that can vary daily and by Navy Recruiting District (NRD). These offers may even vary by classifier—the Navy's ultimate representative in charge of determining a recruit's rating, ship date, and incentive offers.

These processes are not completely measurable or predictable. For instance, although N1 establishes monthly shipping goals by rating and gender at the beginning of the year, these goals may be revised many times during the year. On occasion, these official goals may not reflect the true operational goal—for example, because the end-strength goal has been met before the end of the fiscal year. Hence, even though the official goal has not changed, classifiers restrict offers based on guidance provided by these unofficial goals.

We have some evidence that equally qualified personnel enlisting on the same date but in different NRDs may be offered different enlistment options based on (a) personal characteristics, (b) a cap on NRDs to ensure geographic representation in certain high-tech ratings, or (c) NRD-specific policy that dictates which ship months or ratings receive higher priority on any given day. Two people with identical measurable attributes enlisting in the same NRD on different dates may be offered vastly different ratings and/or ship date options.

Another difficulty is the lack of variation in incentives. In particular, we found that incentives within a rating, such as the regular EB and the EB/Navy College Fund (NCF) combination, as well as incentives across closely related ratings, almost always change at the same time, in the same direction, and in roughly the same proportion. This makes it virtually impossible to disentangle the separate contributions of each incentive in channeling recruits into various ratings.

Also, we have found that the value of incentives is not independent of the probability of enlisting in a rating. When fewer recruits are willing to enlist in a program, the value of incentives for that program typically increases. This lack of independence would lead us to erroneously conclude that higher incentives are associated with a decreasing probability of choosing a rating.

Other recent studies of the market expansion and channeling effects of incentives have found similar difficulties [1, 2]. The inability to include important information on the range of offers, the lack of independence in incentives, and the reciprocal relationship between incentives and enlistments all make it impossible to provide accurate and unbiased estimates of the effects of incentives on rating, ship date, and length of obligation choices. Any study conducted using only historical data will be subject to the same errors.

### **Recommendations**

Do incentives really affect recruit behavior? That remains to be seen. Although there is some indication that incentives may serve other important functions, such as reducing attrition or increasing retention, we believe that understanding their role in the recruiting process is paramount. Therefore, we recommend that Navy recruiting

conduct experiments to understand the roles that incentives, personal preferences, and the classification process play in the ultimate assignment of rating and ship date. A companion document offers detailed recommendations for these experiments [3].

We also recommend, in order to improve the understanding and evaluation of the effect of incentives, as well as the classification process, that CNRC begin to record information on all of the ratings, ship dates, and incentives that are offered to each recruit.

## **Other findings**

### **Research**

We have found that recruits do not necessarily ship in their original rating or ship date assignment. More than 40 percent of recruits who access in the NF, AECF, or Submarine Electronics/Computer Field (SECF) switch their rating, ship date, or both while in the Delayed Entry Program (DEP), compared with an average of 26 percent for all accessions. Although we know that some of this switching occurs because of the Navy's need to fill quotas in these priority programs, we do not know on a case-by-case basis whether these changes occur because a DEP changes his or her minds or because the Navy changes goals or priorities. Further, we do not know what process is used to persuade a recruit to change rating or ship date while in DEP, or what negotiation in the original selection process causes a DEPer to accept a less than optimal (at least to the DEPer) enlistment contract that he or she is subsequently willing to change.

One disturbing finding is that those who switch rating or ship date may do so because they are offered an incorrect incentive to change. We found that about 20 percent of those who change either ship date or rating are offered the wrong EB, compared with about 3 percent erroneous offers for those who never switch.

Finally, we note a finding related to moral waivers. A recruit who accesses with either past legal involvement (from minor traffic offenses to felonies) or preservice drug or alcohol abuse requires a moral waiver. Eleven percent of all FY02 accessions required this waiver, compared with 23 percent of Avionics accessions, the fifth

most prevalent accession program. Several other aviation ratings accessed a disproportionate number of recruits with moral waivers.

### **Recommendations**

We recommend that Navy recruiting reduce the errors in EB awards because they could potentially jeopardize the enlistment contract. We understand that CNRC is considering options—based on our findings—to simplify the identification of the correct incentive, thereby reducing these errors.

We also recommend that the Navy determine whether the relatively large number of recruits with past legal, drug, or alcohol involvement in numerous aviation ratings poses any particular risk, increased attrition, and so on.

If future experiments conclude that incentives serve to channel recruits into particular ratings or ship dates, our findings from this and other recent research [4] lead us to recommend that N1 formulate a set of priorities and guidelines for incentives and the classification process to ensure that they are both cost-effective and successful at achieving the Navy's top priorities. These processes require numerous tradeoffs, the costs of which are not always well understood. Some tradeoffs involve determining (a) the optimal timing of payments, (b) the amount of information that should be provided to recruits about incentives before they enter the Military Entrance Processing Station (MEPS), (c) whether quotas set on the number of EBs available are counterproductive, and (d) whether incentives should be based solely on successful completion of training in the rating in which the recruit originally accessed or some amount should be based on successful completion of any training.

In addition, analysis should be conducted to determine whether qualified recruits should be encouraged to enlist in high-tech ratings, regardless of the DEP posture of less technical ratings. What is the tradeoff in terms of the benefit of meeting goals in less technical ratings versus the cost of recruiting highly qualified recruits to fill high-tech requirements?



Our last recommendation is that the Department of Defense (DoD) should study incentives from the perspective of all the Services. Even though the Navy's budget for EBs has increased significantly in the past few years, both the Army and the Air Force have budgeted over 50 percent more on EBs per FY03 non-prior-service accession than the Navy. Just how much of the half-a-billion-dollar FY03 DoD incentive budget is necessary to compete with the civilian sector, and how much is necessary to compete among the Services? It might be the case that a more cooperative joint Service recruiting effort would prove to be more cost-effective for DoD.

## Background

In the past several years, the Navy has faced an increasingly difficult recruiting market, partly because of low civilian unemployment and an increasing college enrollment rate. These external changes have required the Navy to implement a variety of new strategies to meet its yearly enlisted recruiting goals. In February 1999, the Navy expanded its market by increasing the cap on non-high-school-diploma graduates from 5 percent to 10 percent of enlisted accessions. The Navy also expanded the use of enlistment incentives, both in the amount awarded to eligible individuals and in the scope of eligibility. For instance, in FY97, the total budget allocated to Enlistment Bonuses was \$14.6 million. The EB budget for FY02 was \$100 million—an increase of over 580 percent in 5 years. During that time, the number of ratings eligible for EBs has increased from only the top priority ratings (traditionally the Nuclear Field and the Advanced Electronics Field) to recruits in virtually every rating, particularly those shipping during the hard-to-fill months of February through May.

The distribution of EBs has been based on relatively little research, and what research does exist fails to take into account the changing market conditions of the late 1990s. For these reasons, CNRC and the Assistant Chief of Naval Personnel for Military Personnel Policy & Career Progression (N13) have tasked CNA to investigate the cost-effectiveness of a variety of enlistment incentives, both in terms of their current construction and as alternatives to the current system.

This research memorandum summarizes our analyses of one aspect of enlistment incentives—the effects of changes in enlistment incentives on ratings with similar eligibility requirements. As recruiting for a particular rating becomes more difficult, EBs are usually increased to attract qualified recruits. However, it is not understood whether an increase in the level of incentives offered in one rating decreases the enlistments in a similar rating or ratings, causing unintended negative consequences. For instance, the Navy's two most technical pro-

grams, in terms of the level of difficulty and length of training, are the Nuclear Field (NF) and the Advanced Electronics/Computer Field (AECF). Both programs require a 6-year commitment, and combined they account for about 10 percent of all accessions. Almost without exception, a person who is qualified for the NF would also be qualified for the AECF—the NF having the highest standards of the two, in terms of ability, waivers, age, and so on. Less so, but still in the vast majority of cases, a person who is qualified for the AECF is also qualified for the NF. So, if the EB offered to recruits in the NF increases but the AECF EB does not, how much of an impact does that have on the number of recruits entering the AECF? This is the question that we were asked to address.

First we provide background information about what incentives are available, and the proportion of recruits taking various incentives for a few specific ratings. Next we describe the role of incentives in terms of market expansion and channeling. In the following section, we outline the factors that affect rating selection—those that affect a recruit's decision, and those that affect the Navy's offer. We discuss our findings in terms of various aspects of these factors before turning to our findings of the effects of personal characteristics on rating selection. Our last section concludes with recommendations for future work in this area.

## Enlistment incentives

Enlistment incentives come in a variety of forms and serve a number of purposes. Monetary incentives include an EB, the Navy College Fund (NCF), an EB/NCF combination, and the College Loan Repayment Program (LRP). Recruits who select an enlistment bonus must extend the initial obligation for 12 months, regardless of the amount of the bonus. The exceptions are Gendets, SECF, and those enlisting in a program that has a 6-year obligation. Tier III recruits are not eligible for monetary incentives, and only Tier I recruits who score 50 or above on the Armed Forces Qualification Test (AFQT) are eligible for the LRP and NCF.<sup>1</sup>

### Enlistment Bonus

The EB is money that is promised to those recruits who agree to enlist in a select number of ratings, and it can vary by ship month. EBs can range between \$1,000 and \$20,000, the maximum allowed by law. However, the Navy has never offered an EB greater than \$14,000.

In most cases, the EB payment is not made until the Sailor successfully completes all phases of the initial pipeline training, which can be as soon as 4 months after accessing in the case of Gendets or as long as 18 months or longer for those in long, technical training pipelines. If a Sailor does not successfully complete the training pipeline specified in the enlistment contract, he or she is not eligible to receive any incentive, even if a second pipeline training is completed.<sup>2</sup>

- 
1. The Department of Defense (DoD) groups people of different educational attainment into tiers. Tier I recruits primarily are regular high school diploma graduates (HSDGs). Tier II recruits are those with non-traditional high school degrees, such as General Education Development (GED), correspondence school, and high school Certificate of Attendance. Tier III recruits are high school dropouts.

Starting in FY01, the Navy introduced an EB college kicker incentive, which was exclusively for NFs at first but was expanded to anyone enlisting in a rating that offered a regular EB in November 2000. The incentive was expanded further to include any rating, regardless of EB, for those with a ship date after 1 October 2001. The kicker is EB money over and above the regular EB amount, with increasingly more money for more college experience.<sup>3</sup> Although regular EBs have never exceeded \$14,000, the EB college kicker has made it possible for enlisted recruits to receive a total EB award up to the \$20,000 maximum allowed by law.

In addition to more money, those with a kicker are paid part of their bonus earlier than other recruits. All kicker recipients receive 20 percent of their total EB on completion of boot camp. Those in the NF with a kicker receive 33 percent of the remaining 80 percent on completion of Nuclear Power School (approximately their 18th month), and the remainder on completion of prototype training, about 6 months later.<sup>4</sup> For all other ratings, they receive the remaining 80 percent on completion of their pipeline training.

## Navy College Fund

In addition to EB, a select number of ratings are eligible for the Navy College Fund. The NCF is additional money offered for college that is over and above the Montgomery GI Bill. For instance, in FY02, the Navy offered recruits enlisting in most priority ratings a \$50,000 NCF.

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2. Exceptions are those who are reclassified at boot camp.
  3. Those with Associate or Bachelor's degrees receive \$4,000 or \$8,000, respectively; those who have completed 1 or 3 years of college receive \$2,000 or \$6,000, respectively. Details on how much is awarded for various levels of vocational or college experience are available in the Navadmin message at [www.persnet.navy.mil/navadmin/nav01/navy01287.txt](http://www.persnet.navy.mil/navadmin/nav01/navy01287.txt).
  4. NFs without a kicker are the only recruits who also receive graduated EB payments. Those without a kicker receive 33 percent on completion of boot camp and the remainder on completion of prototype training. All other recruits receive 100 percent of their EB on completion of their pipeline training.

MGIB benefits for FY03 were \$32,400, so the NCF was worth approximately \$17,600 in additional money for college.<sup>5</sup>

In late FY00, the Navy began to offer recruits in select ratings the option of taking a combination EB and NCF incentive, with the value of each lower than the amount that would have been available if they had accepted just one. For instance, recruits who shipped in the Nuclear Field in October 2001 would have been offered the option of taking a \$10,000 EB, a \$50,000 NCF, or a \$5,000 EB/\$40,000 NCF combination.

These are the largest monetary enlistment incentives available to recruits.<sup>6</sup> Another incentive is advanced paygrade on accession for those who enter with some college credits, who provide leads to recruiters that result in enlistments, or who pass the Personnel Qualifications Standards (PQS) while in DEP. Almost none of these incentives, however, are tied to the person's rating or timing of accession. The only exception is advanced paygrade (E-3) for those who enlist in the Nuclear Field, regardless of ship month.

## Trends in incentives

Figure 1 shows the percentage of FY02 eligible recruits who selected each type of incentive for Gendets, NF, and AECF recruits. We have included these three because they are three of the five largest programs in terms of overall recruiting goal, representing about one-third of all FY02 accessions. They also represent two extremes in terms of program requirements: the NF and AECF are priority programs with high quality standards (in terms of Armed Forces Qualification Test score, age, citizenship and moral waivers) and a long enlistment obligation (6 years), whereas Gendets have no recruit

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5. Benefits for those who completed at least 3 years of active duty service and who attend full-time are \$900 for up to 36 months. (Source: [www.gibill.va.gov/education/rates/ch30rtes100102.htm](http://www.gibill.va.gov/education/rates/ch30rtes100102.htm)).

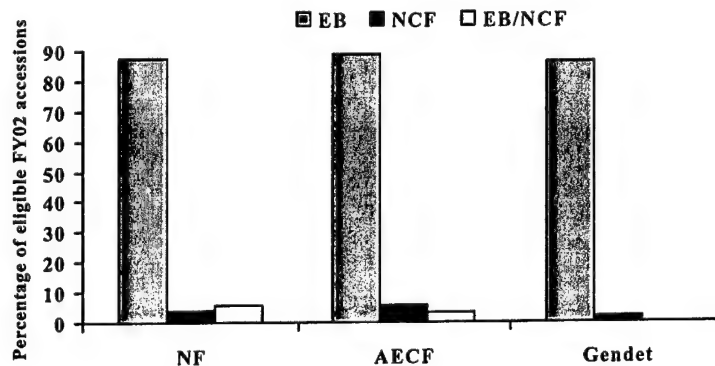
6. The College Loan Repayment Program is another monetary incentive, but less than 10 recruits are awarded this incentive each year. Reference [4] provides details.



qualification standards over and above basic enlistment eligibility and require a 4-year obligation.

The vast majority of recruits who are offered the option of an EB take it. For instance, 86 percent of those who accessed as Gendets in FY02 during a month in which an EB was available accepted the EB. This does not mean, however, that 86 percent of all FY02 Gendet accessions received an EB: high school dropouts are not eligible, and the Gendet EB was not offered year-round. In fact, 68 percent of FY02 Gendets DEP'd and shipped during months in which an EB was available, and at no time during FY02 was the EB/NCF combination offered to Gendets.

Figure 1. Percentage of eligible recruits taking various incentives

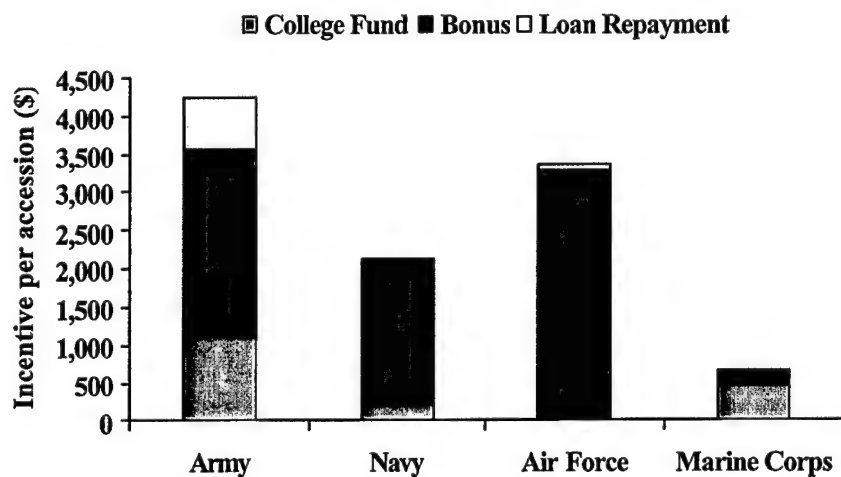


Almost 90 percent of both NF and AECF accessions chose the EB. Unlike the Gendet situation, there was no time during the year in which the EB, NCF, or EB/NCF combination was not available for the NF, and no time for which the EB and NCF were not available for the AECF. For those who DEP'd after 2 July 2002, however, the EB/NCF combination was not available for the AECF.

However, because of rating-specific monthly quotas restricting the number of recruits who may receive an EB, we have underestimated the proportion of eligible recruits who accept an incentive. We estimate that almost all recruits in the NF and AECF accept an incentive, but about 12 percent of Gendets who accessed in a month when incentives were offered did not receive an incentive, so it would appear that the quotas for the NF and the AECF have closer parity with their goals than Gendets. We will return to this point later.<sup>7</sup>

The EB is the incentive on which the Navy, the Army, and the Air Force spend the most money. Figure 2 shows the funding per recruit in the proposed FY03 budgets for all of the Services. Unlike the other Services, the Air Force does not have a college fund, and the Marine Corps does not have a loan repayment program.

Figure 2. Funding for incentives per recruit in FY03 by Service [5]



7. For example, a goal for a rating in a particular month might be 250, but the quota restricting the number of recruits who may receive an EB may be set to, say, 200. In this case, we would calculate the percentage of eligible recruits who accepted an incentive as the proportion out of 250 who accessed that month, rather than 200.

In terms of total monetary enlistment incentives for FY03, the Army and the Air Force have budgeted approximately 99 and 58 percent more, respectively, than the Navy per non-prior-service (NPS) accession. We do not illustrate it here, but this is also true in the proposed FY04 and FY05 budgets, even though the Navy has budgeted increasingly more per NPS accession for both FY04 and FY05 than FY03. For FY04, the Army and Air Force have budgeted 81 and 28 percent more, respectively, than the Navy. And in FY05, their budgets are 98 and 26 percent larger, respectively.

Because the EB is the most popular of all monetary incentives, we will focus most of our attention in the rest of the paper on this incentive.

## **Role of EB**

### **Achieving recruiting goals**

Enlistment incentives potentially serve four main recruiting purposes. One purpose is to increase the total number of people who enlist in the Navy. This is referred to as a market expansion effect. If one rating is experiencing difficulty in meeting its shipping goal, increasing the amount of EB offered in that, or even other, ratings may lead to the enlistment of some youth who would not have otherwise considered service in the Navy. Some number of these additional recruits may enlist in the program having difficulty in meeting goal.

A second goal of enlistment incentives is to channel recruits who have already chosen to enlist into specific programs. Ratings that require an incentive to channel recruits are more difficult to sell to recruits relative to other ratings—perhaps because the obligation is longer, the working conditions are less desirable, or the training is long and difficult. For example, the Nuclear Field offers an EB all year long. In contrast, the Hospital Corpsman (HM) rating, with a larger goal than NF and with a 5-year obligation, has almost never offered an EB. Far fewer recruits qualify for the NF than the HM rating, so it is necessary to entice qualified recruits to choose the NF over other ratings that are viewed as more desirable in order to meet their goals.

An incentive would be considered to have a channeling effect if, all else equal, an increase in that incentive causes an increase in the proportion of recruits to enlist in that rating. But a channeling effect alone is not sufficient to satisfy the Navy's increasing needs for recruits in a particular rating if a simultaneous and equivalent decrease in the goal for a rating with similar requirements does not also occur. In other words, if the Navy has an increased goal of 100 more NF recruits and no other similar rating experiences a decreased goal, a channeling effect will not be sufficient to meet the new goal. If an increased goal of 100 NFs is accompanied by a decreased goal of

100 AECF recruits, however, no market expansion would be necessary—only a channeling effect.

Another function that enlistment incentives could serve is in channeling recruits to ship in off-peak months. This is referred to as a season channeling effect. Incentives are traditionally higher in the months that are the least attractive, at least to most recruits, to enlist. The most difficult months are February through May (FMAM), and the summer months, also known as the surge months, are the easiest. The relative difficulty of certain months is a function of the timing of high school graduation, the largest single source of new recruits, and seasonal variations in holidays<sup>8</sup> and climate.<sup>9</sup>

Finally, enlistment incentives may also serve to entice recruits to enlist with longer service obligations. In general, the Navy requires longer obligations for programs that have lengthier training pipelines. But Navy policy that requires a 12-month extension for recruits who accept an enlistment bonus may enable the Service to entice some recruits to obligate for a longer period of time for some level of financial reward, particularly for those who enlist in ratings with relatively short training pipelines.

One additional point concerning EBs is that they can only influence the rating decision of recruits who are eligible for the rating offering the EB. The more stringent the recruit qualifications, the fewer recruits who will be affected by the change in EB. For instance, increases in the NF EB can only affect the enlistment decision of the relatively few recruits who would be qualified for that program. Similarly, changes in incentives offered in submarine ratings do not affect the enlistment decisions of female recruits. Conversely, changes in the EB offered to Gendets could potentially affect the enlistment decisions of every single recruit.

To put this into perspective, consider the following example. Suppose that in any one year, only 5,000 recruits are qualified to enlist in the

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8. December is the month with the lowest accession goals, about half that of January and one-third that of the summer months.

9. The Navy's only boot camp is located in Great Lakes, Illinois.

NF, whereas 40,000 are qualified to enlist as Gendets. Assume further that a \$2,000 increase in the NF EB increases the proportion of eligible recruits enlisting in the NF by 5 percent, equal to 250 additional recruits. Also assume that the same \$2,000 increase in the Gendet EB increases the proportion of eligible recruits enlisting as a Gendet by only 1 percent. However, this 1-percent increase represents 400 additional Gendet recruits—or 60 percent more recruits than would result in a comparable increase in the NF EB.

It seems reasonable then to hypothesize that increases in the EB of one rating, holding all else constant, would not only increase the proportion of recruits enlisting in that rating but also decrease the proportion of recruits enlisting in a rating with similar characteristics and recruit qualifications. Following the example above, the 250 additional NF recruits could only be derived from recruits of the highest quality, who disproportionally enlist in other high-tech, priority ratings such as the AECF.

## Previous studies

There have been numerous studies of the various effects of incentives on recruit behavior. Reference [6], for instance, studied the effect of recruiter incentives on increasing female enlistments in the Navy, as well as the ability of the NCF and EB to increase high-quality enlistments during the early 1990s. The authors found that both the NCF and the EB were effective in increasing the number of high-quality *male* recruits only.

In the early 1980s, RAND conducted an experiment with Army recruits to determine the effects of the expanded use of incentives in attracting high-quality recruits [7]. The authors found that bonuses were effective in three different respects: expanding the market of high-quality recruits, skill channeling, and in lengthening the term of enlistment.

A more recent RAND study [1] examined the market expansion effects of incentives for all of the Services but found that problems with the data made it difficult to estimate precise effects. The results for the Navy were the most troubling, with the effect of recruiter pay



and unemployment having “perverse effects” on increasing high-quality enlistments. RAND concluded that better estimates of enlistment supply would be possible only with better data, perhaps obtained with the use of experiments similar to that described in [7].

The most recent and comprehensive study was a DoD-wide analysis of the effects of EBs and NCF for 1990 through 1997 [2]. Again in that study, difficulties with the data, particularly those pertaining to the Navy, were noted. The authors found no statistically significant market expansion effect for EBs for the Navy, in large part because of the problems with the data, but they did find a fairly large and significant effect for the Army. That study is being updated with more recent Navy data.

Although numerous studies have been conducted, either they have not found a significant impact of incentives on recruit behavior in the Navy or they were conducted before the Navy’s expanded use of incentives in the late 1990s. In addition, some studies have shown that larger incentives increase propensity to enlist, but we do not know whether, or how much, increased propensity maps to actual enlistment behavior in specific Services. Finally, very little research has been done specifically on the skill-channeling effects of incentives, and no one has studied the cross-rating effects of incentives.

Perhaps the largest source of data problems with previous studies concerns the fact that financial incentives are not the only factor affecting the selection of a rating. The ultimate occupation that a recruit enlists in is the result of a negotiation between two players: *the recruit*, with specific tastes and preferences for various occupations or characteristics of jobs, and *the Navy*, with specific qualifications for various ratings—each with goals that vary by gender and by ship month. We will discuss this rather complicated process in the next section.

## Rating selection

As we noted in the last section, the sorting of recruits by rating and by ship month is a fairly complicated process. It involves a negotiation between a classifier at MEPS, who is the Navy representative in charge of matching a recruit with a rating and a ship date, and the recruit. Using information about the recruit, such as ASVAB scores and gender, a classifier matches the individual's qualifications with ratings that have openings for up to 12 months.<sup>10</sup>

Rating priorities are established by OPNAV N13 and are based on a number of factors, such as a rating's relative difficulty in meeting goal and fleet manning. Of all the ratings for which a recruit is qualified, the classifier is required to emphasize those that have been determined to be a priority.<sup>11</sup> In theory, the classifier offers and discusses one rating at a time, in order of priority. If the recruit is not interested in the first rating, the classifier will proceed down the list until one is found that is suitable to the recruit.

The recruit is presented with various options, both in terms of rating and ship month. He or she may or may not have prior knowledge of some ratings, and some recruits may have decided on a rating before entering MEPS, perhaps because they have friends or relatives in the Navy, because they have advanced training in a particular field (such as a musician or a linguist), or because they have conducted research on specific ratings on the Internet or some other resource. It is the job of the classifier in these cases either to find a date with an opening

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10. The maximum time allowed in DEP without a waiver is 365 days.

11. The exact form of this emphasis may vary from classifier to classifier. Some classifiers may not mention any rating, other than those that are priorities, if they feel that the recruit can ultimately be sold on one of these ratings. Other classifiers may quickly mention other nonpriority ratings if the recruit has initially refused priority ratings, for fear of losing the recruit entirely, for example, to another Service.

in the rating preselected, if the person is qualified for that rating, or to persuade him or her to choose another rating. For instance, even if the person is qualified and there are openings available, the classifier may try to persuade him or her to choose another rating that is on the priority list.

## Personal characteristics

Many of the factors that affect the choice of rating and the set of ratings offered by the classifier are similar, particularly those pertaining to a recruit's personal characteristics, such as AFQT score, age, gender, education, and moral character. From the Navy's perspective, most ratings have a minimum AFQT cutoff score or minimum scores on certain Armed Services Vocational Aptitude Battery (ASVAB) component tests.<sup>12</sup> In addition, many ratings prohibit women from enlisting (e.g., submarine duty), require normal color perception (e.g., the electronics and aviation fields), require citizenship for security clearances, or have more strict requirements in terms of moral waivers than overall Navy requirements, again, predominantly for security clearance reasons.

Over and above these restrictions, some ratings restrict recruits on the basis of education or age. For instance, the Nuclear Field only accepts recruits who are high school diploma graduates (HSDGs) and have not reached age 25 by the date of accession. Several programs, such as the Advanced Technical Field (ATF) and Advanced Electronics Field (AEF), prohibit high school dropouts.

These characteristics may also affect rating choice, from the perspective of the recruit. For instance, older recruits or recruits with some college experience may differ from younger recruits in terms of their preference for longer enlistments, difficult or lengthy technical training, and so on. Likewise, rating preferences may mirror traditional civilian gender choices for Navy recruits, with female recruits preferring medical and administrative occupations over mechanical or construction occupations. There may be a similar race effect in terms of

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12. The ASVAB has 10 components, 4 of which make up the AFQT score.

preferences for ratings or programs that have traditionally recruited disproportionately more minorities. Unlike other personal characteristics, however, race is never a factor in determining a recruit's eligibility for a rating.

## **Economic conditions**

Economic conditions can influence both the decision to enlist and, once that decision has been made, which rating to choose. For the most part, the role of unemployment in the choice of rating is in determining the length of obligated service that the person is willing to accept. We would expect that, when unemployment is low, both propensity to enlist and affinity for longer enlistments would also be low. Unemployment may also play a role in determining the range of ratings offered to recruits, particularly if unemployment disproportionately affects the reenlistment decision of recruits in certain ratings. In other words, if low unemployment is correlated with a lower retention rate in only select ratings, these ratings would be expected to have disproportionately higher recruiting goals during periods of low unemployment.

## **Geographic differences**

Geographic differences can affect the recruit's choice of occupation via unemployment differences but also through preferences for particular types of jobs and duty. For instance, recruits living near Navy submarine bases may be more inclined to volunteer for submarine duty than other types of recruits. Likewise, recruits who live near nuclear power plants may be more likely to enlist in the NF, believing that postservice civilian employment opportunities may be good in that field. Finally, in geographic areas where a college education tends to be less affordable, particularly in low income areas, recruits may disproportionately enlist in the ratings that are associated with the most college credit, particularly those with a 6-year obligation.

## Incentives

Enlistment incentives play a role in rating choice in obvious ways. If a recruit is indifferent between two ratings, he or she will most likely be persuaded to enlist in the one with the higher bonus. For cases in which the recruit is not indifferent between two ratings, incentives in the rating that is least desirable may help to increase its desirability. When the incentive becomes high enough, some recruits can be persuaded to choose the less desirable rating that offers the large incentive. Theoretically, the incentive in each rating is set at a level to entice just the right number of recruits to choose that rating. If the level is too low, goal will not be met. If it is too high, more recruits than are necessary would want to choose that rating. In that case, the Navy is paying too much in incentive.

We illustrate this phenomenon with the following example. Assume that a rating requires 500 recruits, and the EB required to get the 500th recruit to choose that rating is \$5,000. The first 499 are willing to select that rating for some EB less than \$5,000, but the Navy must pay all recruits, regardless of their preference, the amount necessary to get the last person to select that rating. The total cost in incentives to get 500 to choose that rating would be \$2.5 million.

Without precise information about what level of EB would be required to entice the 500th recruit, assume that the Navy set the bonus too high, say at \$6,000. Now, more than 500 would choose that rating, but the Navy can accept only 500. Instead of a total incentive cost of \$2.5 million, the \$6,000 EB offer costs the Navy \$3 million.

Incentives also play a role in the range of options offered by the classifier. Ratings that have been determined to be a priority will always offer an enlistment incentive, presumably with higher incentives being offered in those ratings with the highest priority. However, the ability of incentives to encourage enlistment in particular ratings is in large part a function of whether the person is aware of various options. In other words, the fact that a rating offers a large incentive does not necessarily mean that the recruit is aware of either the rating or the incentive. For instance, if the recruit is eligible for three priority ratings, each with large bonuses, the classifier may be able to sell

the recruit on the first priority rating mentioned. In such a case, the recruit would not necessarily be aware of the other rating options or their incentives.

## Time of year

The last set of factors that affect the selection of a rating, both in terms of recruit preference and availability, is the time of year of accession. The Navy's largest single source of recruits is the high school market. Because the majority of seniors graduate in May or June, a large proportion of recruits prefer to choose a rating that will allow them to ship during the summer. Most ratings provide for larger accession numbers during the summer by increasing the shipping goals from June through September. Even so, the most popular ratings may not be able to accommodate the number of recruits who prefer to ship in the summer months. Recruits who are willing to ship during FMAM will typically have far more options than those who prefer to ship during the summer. Likewise, those who are willing to wait the longest period of time in DEP will also have the most options.

Incentives are largest during off-peak months, so for many recruits the tradeoff is between enlisting sooner for less EB and waiting several months, perhaps finding a temporary job in the interim, and being eligible for a substantially higher incentive. This means, however, that there are real differences between those who are willing to remain in DEP for a long period of time and ship during FMAM and those who are willing to remain in DEP for the same period of time but ship during the summer. In other words, given the same length of time in DEP, those who ship in FMAM are less likely to be from the graduating high school senior market, and may be more motivated by monetary incentives than those who ship during the summer months.

We turn next to a discussion of isolating the effects of EB on rating selection.



## Modeling the selection process

Our task is to estimate the effect that changes in one EB have on the proportion of recruits enlisting in similar ratings. As we have discussed, rating selection is a function of the recruit's preferences and the Navy's needs, both of which are functions of the recruit's personal characteristics, geographic location, time of year, and incentives. Thus, we want to estimate how the probability that a person enlists in various related ratings changes when incentives offered in these ratings change, while controlling for differences in factors that otherwise affect rating selection, such as those just noted. Specifically, these include personal characteristics (e.g., AFQT, gender, age, race, and education) as well as time in DEP, unemployment rate, ship month, a geographic variable, and level of incentives available in similar ratings. In addition, we want to isolate the effects of personal choice from eligibility as much as possible. Therefore, we confine our analysis to the population that is most likely to be eligible for the largest number of Navy ratings. We identify these recruits below.

### Subpopulations

Our definition of the population of recruits that would be eligible for the most ratings is based on the criteria for enlisting in the program with the strictest recruit requirements, the NF. As we noted previously, any recruit who is eligible for the NF will be eligible for almost all ratings and, therefore, could be influenced the most by the full range of Navy incentives.<sup>13</sup>

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13. Some exceptions, which include a small number of recruits, are programs that require excellent swimming skills or perhaps knowledge of a foreign language. Certainly, some recruits who are qualified for the NF would fulfill the requirements for those programs as well, but there are exceptions.

Because the Navy differentiates goals for all ratings by gender, we confine our sample to male recruits. We further restrict inclusion to those who have AFQT scores of 80 or above,<sup>14</sup> are citizens, have normal color perception, are HSDGs, and have not have reached age 25 by active duty date, all of which are restrictions imposed by the NF.

We impose additional restrictions to ensure that we have the group with the greatest likelihood of being eligible to enlist in the NF. In particular, we confine our sample to those who are single and who have no dependents.<sup>15</sup>

Finally, recruits who require waivers are less likely to enter the NF than other rating. Figure 3 illustrates the magnitude of this in terms of moral waivers.<sup>16</sup> We graph the proportion of recruits in the subpopulation defined by the restrictions for the NF-qualified group (i.e., male, AFQT of 80 or higher, younger than 25, HSDG, citizen, normal color perception, single and no dependents) who access with moral waivers, for the four largest ratings for the NF-qualified subpopulation: the AECF, SECF, and Avionics Field (AV), as well as the overall proportion with moral waivers for this otherwise NF-qualified subpopulation—roughly 11 percent.

Relatively few recruits with moral waivers enlist in the NF, and slightly fewer than the overall average enlist in either the AECF or SECF. However, recruits enlisting in the Avionics field are almost 6 times more likely to have moral waivers than those entering the NF. Given this finding, we exclude recruits who enter with any type of moral waiver.

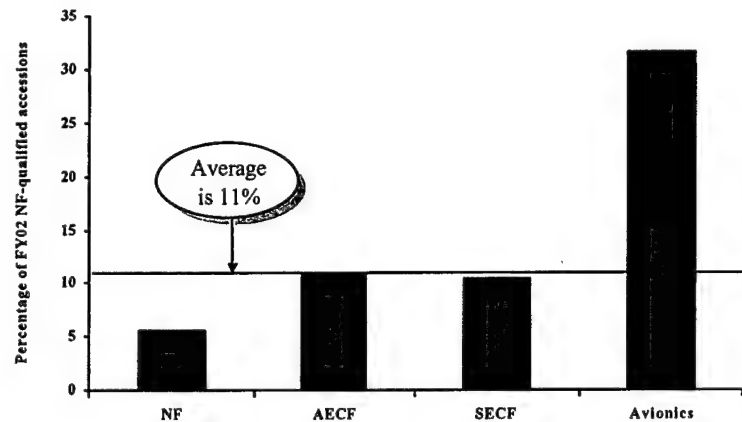
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14. Ninety percent of NF recruits in this time period had AFQT scores of at least 80.

15. Less than 3 percent who are qualified based on our other requirements are eliminated because of dependents or marital status.

16. Moral waiver is defined as having a "D" type enlistment code in any of the six waiver fields on the Personalized Recruiting for Immediate and Delayed Entry (PRIDE) enlisted reservation database, for accessions before FY99. After that time, drug and alcohol waivers were differentiated from other types of moral waivers with an "F" type enlistment code. This is the largest single category of waiver granted, accounting for about 45 percent of all waivers.

Figure 3. Percentage of FY02 NF-qualified recruits with moral waivers by program



The last point requires elaboration. Because the Avionics field has both high AFQT requirements and additional restrictions of normal color perception and citizenship, the Navy is faced with a rather small market of high-quality recruits for the Avionics field. In fact, it is the same market from which the NF, AECF, and SECF programs recruit. Yet the NF, AECF, and SECF programs restrict the number of recruits with moral waivers more than other ratings, leaving the remaining ratings a disproportionate number of high-quality recruits with moral waivers.

For FY02, the proportion of NF-qualified recruits who did not enlist in the NF, AECF, or SECF and required moral waivers was 15.5 percent. If these remaining recruits with waivers were distributed evenly across all remaining ratings, we would expect the proportion of NF-qualified recruits who enlisted in the AV field with waivers to be roughly 15 percent. For unknown reasons, however, twice that many who enlist in the AV require moral waivers—roughly 31 percent. Because most recruits enlisting in the AV field are in this NF-qualified subpopulation, this means that, overall, the AV field has a disproportionate number of Sailors with moral waivers. In fact, almost 24 percent of all recruits who accessed in FY02 in the AV field, including

women and those who would otherwise not be in the NF-qualified subpopulation, shipped with moral waivers—again over twice the overall rate of moral waivers for the entire FY02 accession cohort, and more than any other rating that year. Further, there were only 5 ratings in FY02 that accessed more than 20 percent of recruits with moral waivers, 3 of which were in the aviation field.<sup>17</sup> These findings lead us to two observations.

First, having a moral waiver appears to be a fairly restricting characteristic in terms of rating selection for the NF-qualified recruit population. Even so, the only category of moral waiver not granted to someone who accessed in the NF in FY02 was for an adult felony. Fewer than 20 recruits out of the total of over 42,000 FY02 accessions were granted a waiver of this type, so it is not surprising that none of them enlisted in the NF. Moreover, because a limited number of recruits are allowed to enlist in the NF with almost any type of moral waiver, it is difficult to predict under which circumstances someone with a moral waiver who is otherwise NF-qualified will be allowed to enlist in the NF, or even the AECF or SECF.

Second, if restrictions in the NF that set limits of only 1 in 20 recruits with a moral waiver are based on national security reasons, or based on findings of higher attrition or workplace mishaps attributed to moral waivers, such a disproportionate number of Sailors in aviation ratings who required moral waivers may have unintended negative consequences. We suggest that this finding warrants further review.

## Time period

As we stated previously, the Navy has been modifying the enlistment incentive program in fairly significant ways in the past several years. For instance, late FY98 was the first time that an EB was offered to those enlisting as Gendets. Also in FY98, the Navy changed policy to make a person's incentive amount based on the day that he or she first entered DEP and the day that he or she shipped. Before that, the award was based on the day that the person selected the rating in

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17. The ratings include AM, AME, AV, DC, PR.

which he or she ultimately shipped, regardless of the original DEP date. And in FY99, the Navy waived the requirement for those who enlisted as Gendets and who accepted incentives to sign 12-month extensions.

Because there have been so many significant changes in the incentive options, we confine our study to those who access beginning in FY00 through FY02. Also, the Navy offered different EB options for those who were willing to roll up and ship during the last two weeks of September 2001 following the terrorist attacks. Because it is difficult to control for these options, we drop September 2001 accessions from the analysis.

Finally, we are confining our analyses to those who ultimately ship in a particular month, rather than new contracts. We do so for two reasons. First, for numerous reasons, most of which are not possible to measure or control for, a fairly large percentage of DEPers will either change their rating and/or their ship date—sometimes numerous times. We will discuss this in more detail later. The second reason is that the ultimate goal of Navy recruiting is to ensure that a certain number of recruits ship in a particular month in a particular rating—net of attrition, changes in rating, and changes in ship date. Therefore, we seek to model the effect of EBs on the ultimate selection, in terms of both ship month and rating.

The NF-qualified subsample just defined represents 10.3 percent of all FY00–02 accessions, 41 percent of whom enlist in the NF, and 14 percent of whom enlist in the AE CF, the second most prevalent program. The program with the next largest proportion is SECF, representing just 4 percent of NF-qualified recruits.<sup>18</sup>

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18. During the time period under consideration, the AE and AT ratings merged into the Avionics (AV) program, and the proportion who shipped from FY00 through FY02 as an AE, AT, or AV is almost 6 percent. However, before they merged, neither the AE nor the AT ratings accounted for 4 percent of shippers individually.

## Identifying EBs in effect

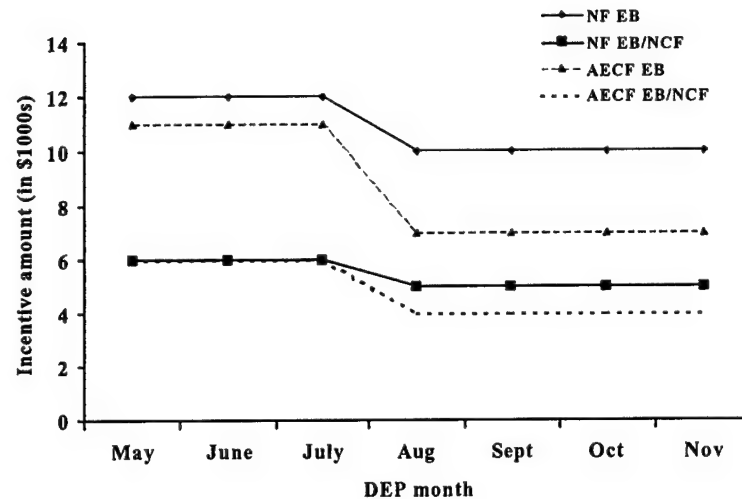
Although the Navy's enlisted reservation database, PRIDE, records what type of incentive a recruit took, as well as the amount, we need to be able to identify not just the incentive that was accepted but the range of incentives that were available on the date that he or she DEP'd and shipped. For the NF-qualified population, we include the incentives for the NF, AECF, and SECF. We note the EB and EB/NCF combination values based on the EB messages contained in OPNAV instructions to the field. The level of NCF is based on messages made available to us from CNRC for FY01 and FY02, but we were not able to obtain messages for FY00. Therefore, we have imputed the value based on the ship records of FY00 recruits from PRIDE.

After noting these values for each NF-qualified recruit, we examined the relationship between all of the various incentives (EB, NCF, and the EB/NCF combination) for these three programs. In that process, it became clear that the incentives did not change independently, a requirement for accurately estimating the effect of each incentive on the enlistments in similar ratings.

In figure 4, we illustrate this lack of independence between the incentives for one representative ship month, November 2002. The month on the x-axis represents the month in which the person DEP'd, for a ship date in November. As the figure shows, the values of all of the incentives move together. So, for instance, recruits who DEP'd in July to ship in November would have been eligible for a \$12,000 EB in the NF and an \$11,000 EB in the AECF. Recruits who DEP'd just 1 month later, who also had a November ship date, would have been offered a \$10,000 EB for the NF, and a \$7,000 EB for the AECF. Though not included in the graph, we note that the NCF offer was the same for the NF, AECF, and SECF in this time period, and the SECF EB in the EB/NCF combination was exactly the same amount as the AECF offer.

In a multivariate analysis, it is not possible to determine how much change in enlistments should be attributed to changes in each of the incentives when some or all change in the same direction and at the same time, as these do. This collinearity exists for all of the incentives, throughout the 3-year time frame under study.

Figure 4. Incentives available for November 2002 shippers



Appendix A contains the correlation coefficients<sup>19</sup> for the NF, AECF, and SECF incentives. The values of the NCF in the EB/NCF combination for the AECF and SECF are perfectly collinear during the time frame under analysis. In fact, the two values are not only collinear but equivalent for all observations.<sup>20</sup> The EB values in the EB/NCF combination are also highly collinear for these two programs ( $r = 0.97$ ), although there were a few occasions when they were not identical.

19. The correlation coefficient is a measure of the strength of a linear relationship between two variables. A value of 1 indicates that all of the values of the two variables lie on a straight line with a positive slope, whereas values of -1 indicate a perfect linear relationship with a negative slope. With perfect collinearity, a change in variable A divided by a change in variable B is a constant, equal to the slope of the straight line. The closer the correlation coefficient is to 0, the smaller the linear relationship between the two variables.

20. Two variables can be perfectly collinear but not identical. For instance, if a 3-unit change in X is always associated with a 5-unit increase in Y, the two variables would have a correlation coefficient of 1, indicating that their values were on a straight line with a slope of 5/3.

The AECF and SECF NCF values are also highly collinear and almost identical. In fact, in only 0.2 percent of the cases were the two values not equal. Finally, the EBs for the three programs are very collinear, with correlation coefficients of 0.90 or higher.

For reference, the correlation coefficients between the EB for the NF and a number of other ratings are also included in appendix A. Although the relationship between the NF EB and these other, less technical ratings is smaller than among the high-tech ratings, we can see that, in general, a large number of EBs change at the same time and in the same direction.

As we noted, such strong multicollinearity makes it very difficult to isolate the effects of changes in just one incentive. There are several options in dealing with multicollinearity, but we have more serious concerns with the incentives, which we will discuss next.<sup>21</sup>

## Errors in incentives

We explored the relationships among incentives, time of year, and goals to try to determine when incentives changed, and why. As we discussed earlier, incentives may serve a season channeling effect, so that it is reasonable to find higher incentives during FMAM within ratings than during other times of the year. However, incentives can change throughout the year in response to other factors. For instance, the Navy establishes beginning of year (BOY) incentives for ratings, promulgated typically in late summer for the following FY. In most cases, these messages contain separate incentives, by rating, for FMAM, versus the summer surge, and October through January. Presumably, these values are set, a priori, in anticipation of the relative difficulty of enticing recruits to ship in off-peak seasons.

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21. Estimates in the presence of multicollinearity are not biased, but can instead be very inefficient. This means that, on average, the estimates represent the true relationship, but the standard deviation of the estimate is quite large. Further, when the standard deviations are large, we cannot determine whether the relationship is random.



In each year under study, however, the Navy has modified these award levels for one or more ratings, and sometimes these changes have occurred more than once. For instance, recruits who shipped in the AECF in July 2002 would have been eligible for a \$7,000, \$5,000, or \$4,000 EB, depending on the day that they first DEPped.

In our process of identifying the various incentives that were in effect on the date the recruit originally DEPped, and the ultimate ship date, it was necessary to read the EB messages that were disseminated to the field for the past several years and to compare these values with the actual awards promised to recruits, as recorded in PRIDE. We discovered that there was a significant number of recruits who have been awarded either an EB, NCF, or EB/NCF combination award that was not consistent with our understanding of the applicable message. Because EBs represent the largest proportion of awards, we focused on these errors.

Rules governing the level and distribution of incentives change from time to time. One of the periods of most frequent changes coincided with the period in which both the scope and level of EB awards expanded during the late 1990s and early 2000s. A significant change during this period was the rule governing the level of award for which a person was eligible. The document governing the rules for EB is OPNAVINST 1160.6A, dated 28 May 1987. Section 4a states that:

members enrolled in the Navy DEP, who, while in DEP, volunteer for an EB rating, or an EB rating with a higher bonus amount, are eligible for the EB provided all other eligibility requirements are met.

In other words, a DEPer could change ratings any time during DEP and be awarded the EB in effect the date of the change. This policy changed with the release of NAVADMIN 161342Z in March 1998:

The amount of EB a member is eligible to receive is based on the EB award level message in effect on the date the contract is signed. This date may be: the date an applicant enters the DEP, or the date that a member is reclassified at RTC. If a subsequent BUPERS award level message becomes effective while the member is in DEP, the original award level message in effect on the day the member entered the DEP remains applicable for that member.

This policy change meant that, if a DEPer changes either his/her ship date or program of entry, the classifier at MEPS making the change must keep track of both the original DEP date of the member (which is not readily available in PRIDE), and a historical record of award messages covering the previous 12 months (the longest time a person could remain in DEP without a waiver). Given our experiences with the messages, we submit that this is not an easy process. Messages do not come out at regular intervals, and each message does not always provide a complete list of award levels for all programs. Typically, mid-year changes include only those programs for which either the EB or the EB/NCF combination has changed. Thus, a classifier may have to look back over several messages to find the relevant one.

We have calculated both the number of shippers and the cost of these errors for FY00 and FY02. We did not include FY01 because of the message that went out pertaining to EB changes for September 2001 in support of Operation Enduring Freedom, which could have caused an unusual amount of confusion.

We used the following rules to define who was promised the wrong EB. We noted the EBs in effect for the following 14 ratings/programs: AD, AM, Gendets, AECF, AE/AT/AV, AO, HM, IT, MM, MS, NF, OS, SECF, and YN, making up 66 percent and 57 percent of all FY00 and FY02 shippers, respectively. For FY00, the EB kicker for college experience was not available to anyone who DEPped before 1 July 2000, at which time it was only offered to those in the NF. Thus, for FY00 only, we eliminated any NF accession who DEPped after 1 July 2000 and who had more than a high school degree.<sup>22</sup> We considered a shipper to have received the wrong EB in FY00 if the EB amount recorded on the ship record in PRIDE did not match the EB that we determined to be in effect on the date the person originally DEPped, and the month he or she ultimately shipped.

For FY02, we again compared the recruit's EB award on the ship record with the amount we determined to be correct based on the

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22. Only those with some college are eligible for the kicker, so we eliminated the group most likely to have received the kicker in this period. This excludes just 22 of the 136 NF FY00 shippers who DEPped after 1 July.

original DEP date and ship date of the recruit. However, the kicker was extended to anyone with college or vocational training by FY02. Unfortunately, PRIDE does not keep track of who received the kicker or the amount; it records only the total EB award. In other words, someone who was eligible for an \$8,000 regular EB award based on rating, and an additional \$4,000 in college kicker, would simply have a total EB award of \$12,000 recorded in PRIDE.

We obtained a list of social security numbers of those who were granted the EB kicker from CNRC, but this list does not include the kicker amount. Without detailed data containing both the regular rating EB and EB kicker amount awarded, we cannot determine precisely the number of recruits who shipped with incorrect EBs in FY02. In the example cited above, it is possible that the correct regular EB for the rating and ship date that the recruit enlisted for was only \$6,000, and not \$8,000. However, we do not have enough information to determine how much of the \$12,000 total award is for regular EB and how much is for kicker. For instance, according to the list provided by CNRC, many recruits with an education code that indicates that they have just 12 years of education, and no degree beyond a high school diploma, received a kicker. It could be the case that they earned enough college or vocational credits, either as part of their high school experience or after high school, to qualify for the kicker, but not enough to warrant a different education coding in PRIDE. That information, however, is not recorded in PRIDE.

We chose to classify all of those who received the kicker as having received the correct amount, which means that our calculation of errors for FY02 will be an underestimate. After determining what proportion of all EB recipients in the 14 ratings were promised the wrong EB, we calculated the average amount of the error. We then extrapolated these findings to all shippers, and calculated the total amount of the EB errors.<sup>23</sup> The results are in table 1.

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23. Because these 14 ratings constitute about 60 percent of all accessions during this time period, and include the full range of length of obligated service and technical skill requirements, we believe that they are representative of all of the ratings that offer incentives.

Table 1. EB errors

	FY00	FY02
Sample percentage of those promised EB that have wrong EB	6.4	5.8
Average error	\$1,260	\$2,137
Percentage of all shippers receiving EB	48	53
Predicted number of shippers with wrong EB	1,563	1,288
Total cost of errors	\$1.97M	\$2.75M

The prevalence of errors in FY00 and FY02 is fairly similar, with about 6 percent of those who receive an EB receiving the incorrect amount. Our estimate of the average error includes both the amounts that were too high and too low, with a positive error indicating that the person was promised an EB that is too large. So, while the prevalence of errors has remained approximately equal, the level of errors has increased, with the average error increasing 37 percent between FY00 and FY02. And those who are promised too much outweigh those who are promised too little. The total cost of these errors in FY02 is \$2.75 million. Recall, however, that this includes only the cost of EB errors. Errors can also occur in the amount of NCF or in the EB/NCF combination awards. Because far fewer recruits elect to take these incentives, however, the magnitude of the errors for those incentives is probably much lower.

The costs that we have calculated above are not the complete costs of these errors. For instance, not all recruits who are promised an incentive receive the incentive because they do not successfully complete the training.

Further, these errors may be detected at boot camp, when the recruit's enlistment package is reviewed. To determine the correct incentive, the reviewer must have both the recruit's original DEP date, which is noted in his or her records, as well as a complete list of incentive messages. Errors in the record, including the wrong incentive amount, can jeopardize the enlistment contract. It is our understanding from CNRC that it does not receive reports from Recruit Training Command (RTC) of any significant number of these errors being found.

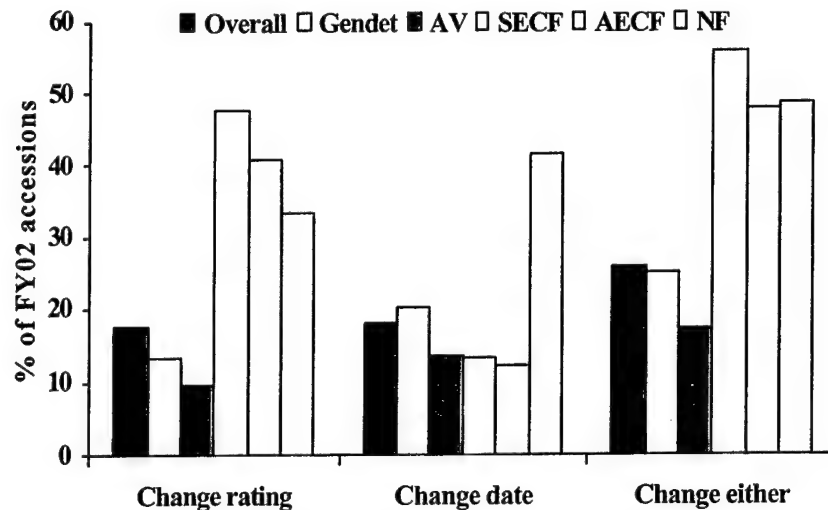
The second opportunity for the identification of EB errors is when the Sailor requests payment of the incentive from the supporting Personnel Support Detachment (PSD) on successful completion of all phases of initial training, including C-schools, if appropriate. Errors caught at this date, sometimes as long as 24 months after accession, have the potential to be very costly to the Navy, particularly because the majority of errors are incentives that are too high. We are not able to determine how many Sailors who shipped with the wrong EB have been told after completing their training that their EB is lower than what they anticipated, but we submit that such a revelation may have devastating effects on the Sailor's morale, and perhaps subsequent reenlistment decisions.

The other possibility is that the errors are never caught. This may or may not be costly to the Navy, depending on the role that these overpayments play in the recruiting process. If, for instance, they serve to bring more recruits into the Navy, they may be cost-effective. However, specific enlistment incentives are typically not public knowledge, nor do potential recruits know a priori whether they will be a recipients of overpayment, so we do not believe that this is the case.

We believe instead that these errors are simply a result of an unnecessarily complicated process. In our efforts to determine the correct EB levels, we found the messages to be subject to interpretation in many cases. In particular, confusion can arise when a message pertains to a change for the current fiscal year only. For instance, the message in the beginning of FY00 stated that the EB in effect for the AECF program for those who shipped between February and May was \$11,000. In February 2001, a new message was distributed, indicating that the award for February through May *2001 only* was increased to \$13,000. However, it was apparently not clear to some classifiers whether those who DEP, for example, in March 2001 to ship in February 2002, are subject to the EB level of \$11,000 established in the original message, or to the new \$13,000.

On further inspection of these errors, we found that the errors occurred very frequently for recruits who changed either their original ship date or program of entry, both of which require the classifier to enter a new record for the DEPer in PRIDE. This switching occurs often, as we illustrate in figure 5.

Figure 5. Proportion of FY02 recruits who change rating, ship date, or both



For instance, almost 50 percent of recruits who ultimately ship in the SECF had originally enlisted in a different program, and over 40 percent of recruits who ship in the NF change their original ship date. For both the AECF and NF, almost one out of two recruits have changed either their rating, their ship date, or both, and well over half of the SECF accessions have done so. Yet for the entire FY02 accession cohort, only one in four recruits changed either their ship date and/or their rating.

Though it is beyond the scope of this research to identify the reasons for such switching, particularly among the priority, high-tech ratings, we speculate that it has much to do with last-minute changes in goals or with the fact that a priority rating does not have enough recruits to ship that month. The switching appears to take place more within the group of high-tech ratings, illustrating the point we made earlier about the effect of EBs on the highest quality recruits. In other words, only those who are eligible for the NF would be affected by changes in the incentives of every rating in the Navy. Likewise, only those who are qualified for the NF, AECF, and, to a lesser extent, the SECF, could be swapped for these programs should the need arise.

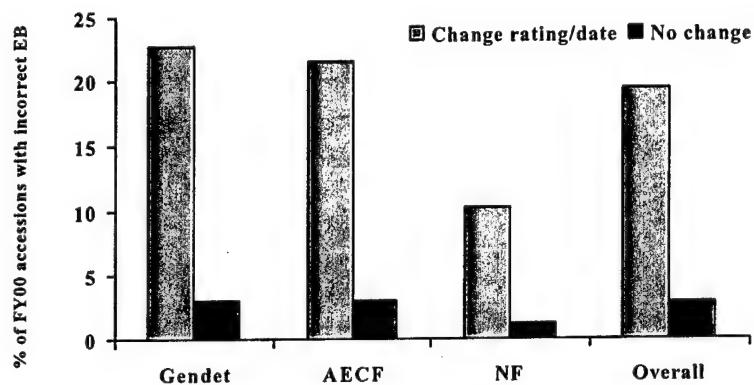
In discussions with classifiers at MEPS, we have learned that sometimes DEPers are unable to enlist in their first choice rating and/or ship date, for example, because the goal has been filled, or, in the case of NF, they were unable to take the NF qualification exam before being classified. In these cases, the classifier notes that the DEPer would be willing to change either rating and/or ship date if openings occur. Such openings may become available because of higher than expected DEP attrition or an increase in goal. When that happens, the classifier goes through the list of these DEPers until a match is found. However, it is not known how many DEPers do not get their first choice, or what negotiations are necessary to entice a DEPer to select a less-than-optimal rating or ship date, as opposed to perhaps enlisting in another Service or simply refusing to enlist.

How does the classifier or recruiter encourage a DEPer to make either a rating or a ship date switch, if an adequate number of willing DEPers like those described above cannot be found? Again, the answer to that question is beyond the scope of this research, but we do know that those who switch either their ship date or their rating are, in large numbers, offered the wrong incentive—and in most cases the promise is too high. We discuss this phenomenon next.

## **The effect of changes in rating or ship date**

Because changes to ship date, rating, or both are so frequent, we speculated that such switching could create confusion in determining the right incentive amount. Although the policy change in 1998 required levels to be determined by original DEP date, (a) this may not be universally understood, (b) the way in which messages are promulgated may make it too difficult for a classifier to determine the right level, or (c) the original DEP date may not be readily available to the classifier when making a change. To see whether these changes may be the source of some of the errors, we calculated the proportion of errors for FY00 shippers separately by whether the shipper ever changed either ship date or rating while in DEP. Figure 6 illustrates these differences for all shippers in the 14 ratings outlined previously, and separately for Gendets, AECF, and NF.

Figure 6. EB errors by changes in ship date or rating



It is clear that the vast majority of errors occur when a DEPer changes rating or ship date, and this is true regardless of the DEPer's ultimate rating. However, the NF experiences the fewest errors, which may be because the EBs for the NF have been more consistent year to year than any other of the 14 ratings included in our analysis.

What does this mean in terms of the cost of errors? Most of the errors are occurring for DEPer's who are already in DEP but are switching ratings and/or ship date. In other words, these errors do nothing to expand the market. Instead, they are a bonus paid for those who change their minds, who are allowed to switch to what was their original first-choice rating or ship date, or who are encouraged to change either rating or ship month to better suit the Navy's needs. However, for every rating that benefits by the addition of the new DEPer, some other rating is now minus one DEPer who must be replaced.<sup>24</sup>

Although we do not know what motivates a DEPer to change ship dates or ratings while in DEP, if it is based on erroneous EB offers

24. Ratings are rarely overbooked, particularly 1 or 2 months before ship date. Consequently, unless the goal has been exceeded, the loss of a DEPer in a rating will require a replacement to meet that goal.



promised by classifiers, this may or may not later jeopardize the enlistment contract and/or lead to higher attrition. In addition, this creates an inequity in EB offers. In other words, two recruits, who DEP'd the same day and shipped the same day in the same rating, could have different offers, in violation of the Navy's regulations. Therefore, we believe it is important to minimize these types of errors. It is our understanding that, based on these findings, Navy recruiting is working on a solution similar to what we propose to eliminate these errors.

One other point that arises, however, is the fact that incentives that are not clear even to some classifiers, whose job it is to know and understand them, cannot be clear to a DEPer who has only a few minutes with a classifier to have them explained and to contemplate the relative weight of all of the options, including term of enlistment, occupation, and other decision criteria. It also means that it is not possible to accurately measure the impact of incentives on enlistment behavior if all recruits are not provided the correct set of incentive options when making the enlistment decision.

## **Additional specification issues**

We have already noted some significant problems with the EB process that make it difficult to accurately estimate the true cross-rating effects of EBs, specifically multicollinearity in incentives and errors in incentive offers. As we have discussed, these errors make it impossible to produce unbiased and/or efficient estimates of the cross-rating effects of EBs. However, there are additional specification issues that also seriously affect the ability to accurately estimate the impact of incentives on rating choice. If additional analysis of the cross-rating effects of EBs is to be undertaken in the future, it is important to understand what these issues are.

### **What options were offered?**

The most serious difficulty that we have in being able to estimate unbiased estimates of the channeling effects of incentives is that we do not know what rating, ship date, and incentive options were offered. No data are available to determine what ratings the classifier mentioned during the enlistment process, nor are data available as to

what was discussed with the recruiter. In the following subsections, however, we note some specific issues related to the NF-qualified population.

#### **NF recruiting program**

For the purposes of general production recruiters, there are two types: Nuclear Field recruiters and all others. Nuclear Field recruiters are almost always NF-qualified Sailors assigned to recruiting duty as part of a regular shore rotation. They are dedicated to obtaining NF recruits, although in their search for NF-qualified people, they may identify some who are qualified but not interested in the NF and who subsequently enlist in another rating. All other recruiters have only general recruiting goals, in terms of number of recruits per month.

Until recently, the Nuclear Field was the only field for which recruiters could target their recruiting efforts. This meant they could discuss with the potential recruit specifics about the program, its training, typical career path, special pays, types of duty, and so on. The NF was also the only program that contained detailed information on the Navy's recruiting web site. As a result, on the day that an NF-qualified recruit entered MEPS, he or she had the highest probability of having already been exposed to some basic information, including at least the magnitude of incentives offered for the NF. We cannot say the same for any other program.

#### **Other NF benefits**

The NF is unique in several other respects. First, as we noted, it is the only field in which a recruit accesses at a higher paygrade. The NF program also offers the fastest promotion opportunities, the most amount of college credit awarded for technical training, and some of the highest special duty pays (both for the NF and for submarine duty) of any field. In monetary terms, the first-term benefits of the NF certainly outweigh the benefits of any other program in the Navy. If the DEPer is aware of these differentials, he or she may select a rating based on these other first-term benefits, regardless of the level of the EB. In addition, because the EB for the NF is always higher than the EB for any other program, we can't be sure whether a DEPer enlists in the NF because of the value imputed for these other benefits, for

the EB alone, or for the value of the entire incentive package. Further, it is not possible to know how much, if any, of these first-term benefits are known to the DEPer.

#### **What else was offered?**

If a recruit were otherwise NF-qualified, but enlisted in a rating other than the NF, we can be fairly certain that he or she was offered the opportunity to enlist in the NF, but we cannot be certain about any other ratings or programs that were discussed by the classifier.

Although we have focused on the NF-qualified population, we can draw similar conclusions for other categories of recruits. We do not know how much a recruit knew about the range of potential ratings or incentives before going to MEPS, nor do we know what ratings or incentives were offered by the classifier at MEPS. We understand that it is possible to capture information pertaining to which rating options would have been shown to the classifier by the classification software, based on the recruit's qualifications and the NRD's priorities, but this information alone is not sufficient. In other words, we do not know which of these options were ultimately offered, which incentives were also offered in conjunction with each rating and ship date (e.g., because so few recruits accept the EB/NCF or NCF incentives, do classifiers routinely fail to offer them?), or in which order.

Ultimately, this inability to measure or control for recruit awareness means that we do not know the reason for the incentive's inability to influence enlistments in a related rating. Is it because the incentive was not high enough, because recruits were not aware of the incentive or rating option, or because other characteristics of ratings with similar recruit criteria are more important to recruits? Without this fundamental information, it is not possible to provide unbiased estimates of the effects of incentives on rating choice.

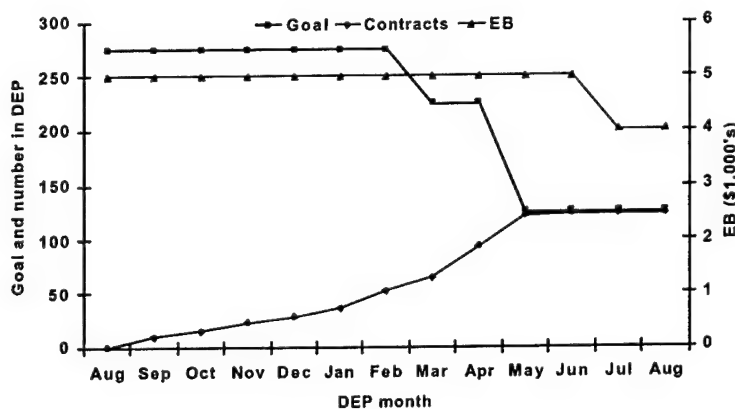
Other serious problems with the data exist, which we describe next.

#### **Which factors are independent?**

In theory, the value of incentives should increase either because the goal for a particular rating increases or because classifiers are experiencing difficulty in enticing enough recruits to enlist in that particular

rating in a particular month with current incentives. The opposite is true when an incentive decreases. In figure 7, we illustrate what happens in practice by plotting the relationship between goals, incentives, and contracts for male AECF August 2002 shippers. Again, we plot DEP month along the x-axis. The bottom line shows the cumulative number of people in DEP who ultimately shipped in the AECF in August 2002. So, for instance, on 31 October 2001, there were 15 people in DEP who ultimately shipped in the AECF in August 2002, the goal for AECF for August 2002 shippers was 275, and the EB for recruits who DEPed that month and shipped in the AECF in August 2002 was \$5,000. In November, an additional 8 people joined the DEP who ultimately shipped in August 2002 in the AECF, making the cumulative total 23 DEPs by 30 November 2001. Note that this total is net of attrition and reflects the number who *ultimately* shipped in the AECF in August 2002, regardless of what their original rating and or ship date may have been.

Figure 7. AECF goals, contracts, and EB for August 2002



### Changes in goals

Several interesting phenomena are worth noting. Whereas the goal decreased by 55 percent over the 12-month period, from 275 to 125,

the EB offer decreased by only 20 percent. Further, the decrease in EB didn't occur until after the goal had been reduced the second time. However, although the EB offer didn't decrease until July, there was only one new contract in June, who ultimately shipped in August as an AECF, and no new contracts after June. Also, the most new contracts were added in March through May—when the EB remained at the same level as for the previous 6 months, when relatively few new recruits signed up to ship in the AECF in August 2002.

This raises several questions concerning the mechanics of how a rating is selected and, in particular, the impact of EBs on rating choice. Do EBs change in response to difficulties in obtaining goal and then decrease after the goal has been met? If so, as figure 7 seems to support, incentives are not exogenous to rating choice, which is one of the requirements of a multivariate analysis.

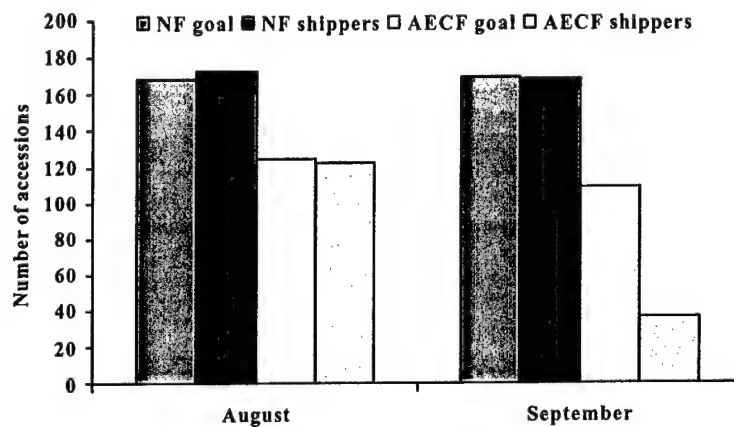
Why is this a problem? In multivariate analysis, an underlying assumption is that the outcome variable—in our case, the probability that an NF-qualified recruit enlists, for example, in the AECF—is a function of a number of independent factors, such as personal characteristics, incentives, and ship month. One of the requirements for unbiased estimates is that these independent variables be independent of each other as well as independent of the outcome variable. In fact, the outcome variable must be dependent on the independent variables, and not the other way around. This is what is meant by a variable being exogenous.

It appears that this is not the case in terms of incentives. When the outcome variable, or probability of enlisting in the AECF, goes down, the EB increases. Or, in the example shown in figure 7, it is a multi-step process in which first the goal is met, causing the probability of a recruit to enlist in the AECF to drop to 0, which then causes the EB to decrease. If we were to model the probability of enlisting in the AECF as a function of its own and other EBs, in this case we would overestimate the effect of a reduction in EB on that probability. While the EB was \$5,000, the probability of enlisting was increasing with time. But in the 2 months after the EB was reduced just \$1,000, the probability of enlisting in the AECF went to 0. Clearly, this is not because the EB was reduced but the result of outside factors. Yet a

multivariate analysis would attribute all of that reduction in probability to the rather small reduction in EB.

We illustrate a different phenomenon in figure 8. In August 2002, the NF goal was met, while the AECF shipped 2 less than (or 1.6 percent of) its goal. In September, however, the NF goal was again met, while the AECF missed goal by 86, or 70 percent.

Figure 8. Difference between goal and shippers, FY02



Given the large proportion of recruits in the NF and AECF who shift rating and/or ship month, why didn't the Navy try to encourage some DEPers to switch to the AECF and/or to switch ship month to meet the September goal?

In our discussion with personnel from CNRC regarding this point, they noted that the AECF undershipped by such a large number in September because the goal had "unofficially" been reduced beyond that which was stated in the official goaling letters. The reduction in the AECF goal was necessitated by a reduction in the end of fiscal year endstrength requirements. In fact, the AECF was not the only program that experienced a fairly significant reduction in its unofficial September goal.

This illustrates that, even if official goals are known, which in most cases they are, such unofficial changes are not and therefore cannot be controlled for in a multivariate analysis. It is not clear that such unofficial goal changes are documented; they are usually communicated via unofficial channels, such as e-mails, or through a message posted on PRIDE for classifier's reference only. We expect that other types of unofficial policy changes or guidance given to classifiers occur fairly regularly, such as NRD internal guidance that may vary as often as daily. (We will return to these NRD policies later.) Because such guidance is not documented, it cannot be accounted for in an analysis.

### **The role of quotas**

As we noted earlier, rating-specific quotas are set each month for the number of enlistment bonuses that may be offered. In many cases, these quotas are less than the monthly goal for that rating. After the quota has been met, however, it is at the discretion of the classifier to ask CNRC for an EB for a recruit, on a case-by-case basis. If a request is granted, the EB is paid for by either reducing a quota in a future month, or by taking a quota that was not used in a previous month.<sup>25</sup>

This policy raises several concerns. First, under what circumstances will a classifier request an additional quota, or will CNRC grant one? Classifiers may choose to request the EB only if the recruit is very reluctant to choose the rating—a condition that cannot be measured or known to anyone but the classifier.

A more important question, however, is what is the role of EBs when quotas exist that are lower than the goal? If in fact, incentives do serve to channel recruits into ratings, and if the levels of EBs are set to ensure that the goal is met, then establishing quotas that are less than the goal jeopardizes the ability to meet that rating's goal.<sup>26</sup>

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25. Source: Mr. Gary Ton, CNRC Enlisted Incentives Program Manager (Code N511).

26. See our previous example on the correct level of EBs in the Rating Selection section.

In the most extreme case, in which no one would enlist in the rating without some monetary incentive, the remaining goal could only be filled by recruits willing to take the NCF (if available) or some other incentive that is available primarily to the small proportion of recruits from the college market—incentives such as the LRP or the College Kicker. But, as we have seen, these other incentives are taken by far fewer recruits. If, on the other extreme, the remaining goal can easily be achieved after the quota has been met without any type of incentive, the necessity of the EB for anyone is questionable.

We understand that the budget for EBs is finite, and that there are many competing ratings and programs for the limited funds. However, we suggest that a policy of establishing a quota that is less than the goal, after allowing for some small margin of recruits who would naturally choose the NCF over the EB, may be counterproductive.

#### **What is the choice variable?**

Another issue pertains to the question of which is the variable of choice for the recruit. Is a recruit's primary concern rating, ship date, or incentive? We suppose that the answer depends on the person, with factors affecting the decision going beyond those that are readily available in terms of personal characteristics, unemployment rates, or geographic location.

For instance, a recruit who has an Associate degree in a medical field may want to enlist only in the HM rating, regardless of when or what incentive is offered in any other rating. But, if an EB existed in the HM rating only during FMAM, he or she might be persuaded to wait until then to ship. For these people, the priority ordering of attributes is rating, incentive, and ship month. For other recruits (e.g., those in the workforce who have just become unemployed), their priority may be to ship as soon as possible, regardless of rating or incentive.

Finally, some recruits may be motivated in large measure by money, and therefore choose incentive as their top priority. Given that they want to maximize their incentive, this would mean that they almost certainly would have to ship during FMAM, when incentives tend to be higher. For them, the incentive choice is primary, but that decision leaves little room for choice of ship month. However, it may leave



ample rating choice, depending on how long before ship month the recruit joins the DEP.

In the first and last of these examples, time in DEP was not an issue, but it was in the second case, in which the recruit wanted to spend as little time as possible in DEP. What this points out is that time in DEP can depend on numerous factors. Sometimes it is a choice variable in itself, whereas for others it is simply a by-product of other choices.

We also believe that the choice over the priority of these three enlistment attributes—rating, incentive, and ship month—is not always the purview of the DEPer. If it were, the range of ratings offered by the classifier would have to include every one that the person is qualified for that has openings for the next 365 days. Yet rating priorities vary by season, and classifiers are more concerned about fulfilling in-month shipping goals, particularly in the last week of the month, than filling goals for the future.

In addition, the more popular a rating is, the more likely it is that relatively few openings exist in the short run. So, ratings that are easier to sell should have recruits in the DEP longer than others.

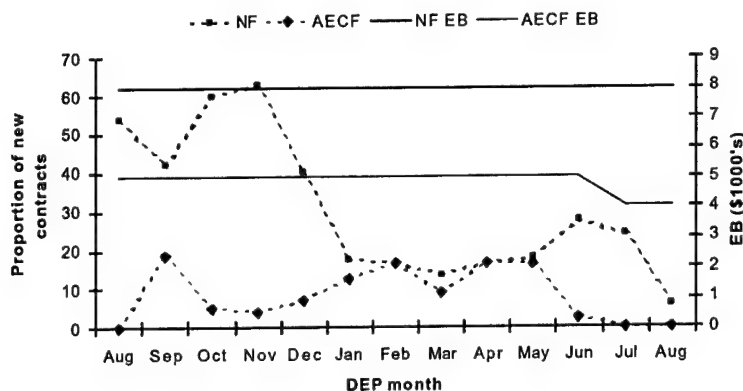
We illustrate the interaction of some of these factors in figure 9. We plot the proportion of NF-qualified recruits shipping in the NF and AECF in August 2002, by DEP month. We also include the EB offers for each program during this time period. For instance, about 56 percent of those who DEPped in August 2001 and accessed in August 2002 shipped in the NF, whereas no one who DEPped that month shipped in the AECF in August 2002.

Over 40 percent of NF-qualified recruits who DEPped before December enlisted in the NF, with relatively few enlisting in the AECF. It is not until the winter months that the two probabilities merge. Yet throughout the period of August through May, the ratio of NF to AECF EB is the same. This discrepancy is not caused by differences in goal. Although the August shipping goal for both the NF and AECF decreased throughout the year, up until May, the goal for the AECF was actually larger than that for the NF.<sup>27</sup>

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27. For July 2001 through February 2002, the AECF goal was 40 percent higher than the NF goal; for March and April, it was 33 percent higher.

Figure 9. Probability of shipping August 2002 in NF and AECF by DEP month



Why, then, is there such a difference in the probability of enlisting in the two fields? We speculate that it is either (a) because the NF is much easier to sell than the AECF given the relative levels of EBs, so that, as we noted previously, the NF DEP is larger than the AECF, or (b) because classifiers do not offer recruits the option of the AECF 12 months out from ship date, but they do offer the NF. In this way, the NF DEP pool can fill up months in advance, ensuring that goal will be met. Certainly, the NF has a higher priority than the AECF, but we do not know whether it is also an easier program for classifiers to sell. It could be that DEPers who ultimately ship in the NF disproportionately have rating choice as their number one priority, with EB and ship month secondary. Perhaps, they have been enticed to enlist in the NF because of some of the other first-term benefits we noted. Or, given the relative difference in EBs, perhaps the NF is much more desirable than the AECF.

#### Why do DEPers switch?

An additional issue, not illustrated in these figures, is one that we have already discussed. The contracts noted in both figures 7 and 9 are new contracts, by month, who *ultimately* shipped in either the AECF or NF. What we haven't illustrated is:

- How many of these new contracts, by month, originally agreed to ship in August 2002 in another program, and switched into the NF or AECF
- How many new contracts, by month, were originally scheduled to ship in the NF or AECF in a different month, but switched to August 2002
- When the switch occurred.

## Summary of issues

We have identified several serious issues with incentives and the classification process that make it impossible to provide accurate, unbiased estimates of the channeling effects of incentives. The most serious of these is the lack of information pertaining to the range of ratings, ship dates, and incentives presented to the recruit. Without this information, we cannot determine whether incentives have no effect because they were not offered or because they are simply not effective. Conversely, we cannot conclude that changes in incentives that are associated with changes in enlistments are caused by the incentives themselves or by the correlation of incentives to a constellation of other factors that have a much more important role in determining a recruit's ultimate rating, ship date, and incentive.

Without being able to measure and control for these factors, many of which we submit are not completely known to us or to Navy policy-makers, a more thorough understanding of the role that incentives have in rating selection is not possible.

Even though we can't estimate the effect of incentives, we can estimate the effect that personal characteristics have on ultimate rating selection. The next section presents our findings.

# Effects of personal characteristics

## Parameters

Although we have established that we cannot accurately estimate the cross-rating effects of incentives, we wanted to get a better understanding of the effects of certain recruit characteristics on ultimate rating selection. As we discussed previously, these characteristics can affect both eligibility and rating preference. Hence, we will continue to confine our discussion to the NF-qualified population, which controls, to the extent possible, for Navy qualifications and demand. In addition, because we do not know why recruits switch rating and/or ship date, we confine the sample to those who ship in both their original rating and ship date.

To control for differences in goals and incentives as much as possible, we separate the population by season of ship date and look at the two extreme seasons in terms of goals. The first is the FMAM season, in which relatively few graduating high school seniors access, unless they are willing to stay in DEP for a very long period of time. The second is the summer surge months of June through August. We eliminate September, the last month of the summer surge, because it is also the last month of the fiscal year. Therefore, September is a month in which all FY goals must be met, which can result in multiple and large changes in goals and/or incentives.

Finally, because of the interaction between days in DEP and ship month discussed earlier, we also include the number of days that the recruit spent in DEP. This is not necessarily a choice variable for the DEPer, if, for instance, his or her primary concern is to enlist in the NF, and the only option for that rating is to be in DEP for a relatively long period of time. Conversely, factors that make a recruit willing to wait in DEP for months in order to enlist in his or her first rating choice may be correlated with other recruit attributes that affect the selection of a rating.

We control for as many factors as possible but are still not able to disentangle the effect of characteristics on the recruit's choice from the effect the characteristic has on the range of ratings offered by the Navy. Even so, we believe that it is informative to see what effect each characteristic has on the ultimate rating match. Such information may be useful in conducting future research on rating choice, from the perspective of the recruit, but also in terms of what a classifier offers to whom, and why.

## Estimation

We estimate a logistic regression of the probability that an NF-qualified recruit who ships in each of these seasons enlists in the NF, as a function of recruit characteristics, state-level monthly unemployment rate, fiscal year dummies (to control for overall goal and policy changes), days in DEP, and by NRD. There are 31 NRDs in the United States; most include some portions of at least two states, and sometimes more. We have chosen NRDs as the basis for geographic differences because Navy policy and procedures may be more homogeneous within an NRD than across the nation. Thus, differences in NRDs in terms of the proportion of recruits enlisting in particular ratings may reflect both Navy phenomena as well as geographic phenomena that we have not been able to capture with the state-level unemployment rates. The dependent variable in each equation is a dichotomous variable, with a 0 indicating that he/she did not enlist in the NF and a 1 if he/she did. We then estimate a second logit in which the dependent variable is whether the recruit enlisted in the AECF.

Table 2 contains descriptive statistics of the independent variables for all NF-qualified recruits for FY00 through FY02. (The logit results are provided in appendix B.) We note a few interesting observations about the means of the variables. First, there is a difference in some of the characteristics by ship date, with slightly older and more educated recruits accessing during FMAM than during the summer, as expected. Likewise, the number of days in DEP for those who ship during FMAM is about half that of those who ship during the summer. Again, we do not know whether this is a reflection of recruit preference, with those who ship in FMAM much less willing to wait to enlist,

or of the classifier offering the option of shipping during FMAM only to those who DEP in the late fall or early winter, in order to meet the hard-to-fill and more imminent goals.

Table 2. Summary statistics for NF-qualified population

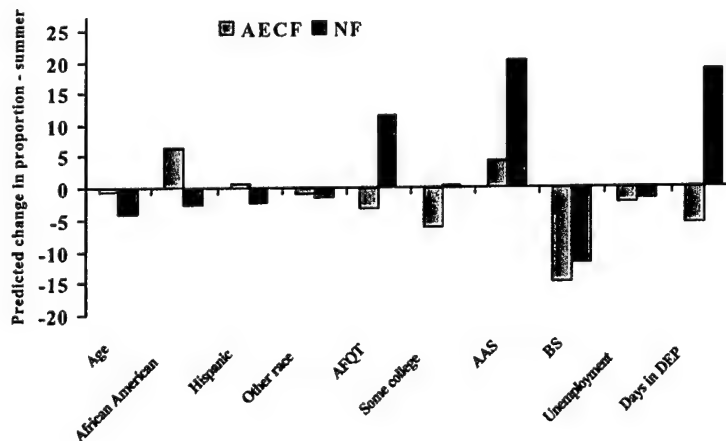
Variable	June–August		February–May	
	Mean	Standard deviation	Mean	Standard deviation
Personal characteristics				
Age	18.4	1.8	19.8	1.8
AFQT	87	5.9	89	6.2
Race				
Caucasian	.75	.43	.73	.44
African-American	.06	.24	.06	.24
Hispanic	.10	.29	.10	.30
Other	.09	.29	.11	.31
Education				
HSDG only	.94	.24	.86	.35
Some college	.04	.20	.10	.30
Associate degree	.01	.08	.01	.12
Bachelor's degree	.01	.09	.02	.15
Days in DEP	171	125	83	79
State unemployment rate	4.5	1.0	4.7	1.1
FY00	.37	.48	.34	.47
FY01	.36	.48	.35	.48
FY02	.28	.44	.31	.46
Proportion enlisting in				
NF	.26	.44	.38	.49
AECF	.19	.39	.15	.35
Sample size	3,319		2,658	

One last point is that a much larger proportion of those who ship during FMAM, compared with those who ship during the summer, enlist in the NF. This is because fewer recruits access in FMAM, and the NF attempts to level-load all year long. Thus, as accession numbers decrease, a larger proportion must enlist in the NF to maintain the same absolute number of NF accessions each month.

## Comparison across programs for the summer surge

The interpretation of coefficients from a logistic regression is not straightforward; therefore, we show the impact of each characteristic by using the coefficients in appendix B to calculate the predicted change in the probability of enlisting in the NF or the AECF with a 1-standard-deviation increase in each continuous variable,<sup>28</sup> holding all other factors constant. We choose 1 standard deviation because it allows us to look at the same relative changes for each variable. For categorical variables, we calculate the difference in the predicted proportion enlisting in the particular program for those with the given attribute vs. the overall predicted proportion.<sup>29</sup> Figure 10 shows these changes for both the NF and the AECF during the summer surge.

Figure 10. Predicted change in proportion enlisting in the NF and AECF during summer



28. Continuous variables are all variables that do not indicate inclusion in a particular category. For instance, age and AFQT are continuous variables, whereas race and NRDs are categorical.

29. For instance, we predict the proportion that would enlist in the NF if all recruits were African-American, holding the value of all other variables constant. We then subtract from this value the predicted overall proportion enlisting in the NF.

The predicted changes across ratings but within a season allow us to see whether changes in one characteristic create fairly equivalent changes in magnitude but offsetting changes in the two programs. For instance, we predict that, for summer shippers, an increase in the AFQT of all recruits of 6 points, holding all other factors constant, would increase the proportion enlisting in the NF by more than 11 percentage points. We also predict a 3-percentage-point reduction in the proportion of recruits who would enlist in the AECF. The gains to the NF with the increased AFQT are not completely offset by the loss to the AECF. This indicates that, within the group of NF-qualified recruits, those with higher AFQTs are being drawn away from other programs, in addition to the AECF.

Age has a larger impact on enlisting in the NF than the AECF, with a 1.8-year increase in age resulting in a 4-percentage-point reduction in the proportion enlisting in the NF, holding all other factors constant, and a very slight, and not statistically significant, increase in the proportion enlisting in the AECF. Because of the age cutoff for the NF, this may reflect both preferences as well as the Navy's preference for younger recruits in the NF.

Days in DEP have the largest impact on the enlistment decision, with an increase of 125 days in DEP predicted to result in an 18-percentage-point increase in the proportion enlisting in the NF, and roughly a 5.6-percentage-point reduction in the proportion enlisting in the AECF. Again, this may be an indication that a requirement of enlisting in the NF is to agree to wait a relatively long time in DEP, and therefore not be a reflection of a DEPer's preferences for a longer DEP period, regardless of rating preference. In other words, some recruits may select rating (NF) as their first choice, regardless of EB or ship month. For these recruits, their only option, given they will enlist in the NF, is to wait a long time in DEP. For them, days in DEP is imposed by their rating choice. However, for some recruits, time in DEP may be their first choice, preferring to DEP in the fall of their senior year, for example, which means that they must wait at least 8 months to access. Their willingness or desire to wait a long time in DEP may also be correlated with other (unmeasurable) attributes that result in them enlisting in the NF in higher numbers.



The largest race difference is for African-Americans. We predict that they are more likely to enlist in the AECF, and slightly less likely to enlist in the NF. Referring to appendix B, we find this difference to hold for FMAM as well, where the difference is statistically significant for both NF and AECF. For the summer surge, this difference is significant for the AECF only.

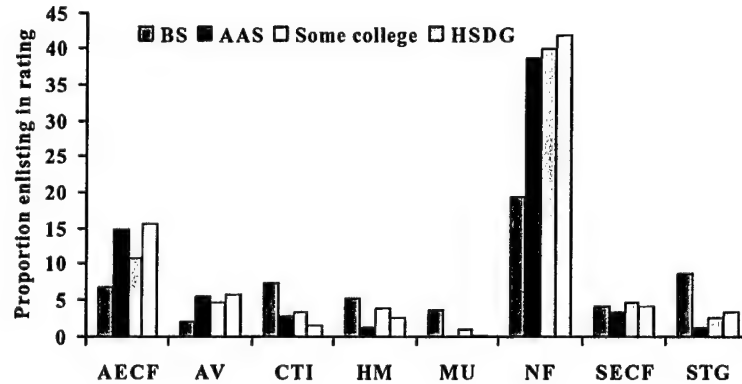
Differences in rating assignment by race can be a function of personal preferences as well as differences in offerings made by classifiers. It is not possible for us to identify the reason for the differences by race, but we suggest that this may be an important finding to pursue. If the Navy is unable to attract high-quality African-Americans into the NF, either because there are relatively few African-American NF recruiters to serve as role models or because classifiers perceive African-Americans to be hard sells for the NF rating so they don't offer it as often, the Navy may be able to channel more high-quality minorities into the NF without the use of additional monetary incentives but with other, cost-effective policy changes.

The magnitude of the effect of college experience varies with the level of that experience. Recruits with some college are slightly less likely to enlist in the AECF, with no discernible difference in enlisting in the NF. If all recruits who access in the summer had Associate degrees (AASs), all else equal, we would predict an increase of about 21 percentage points in the proportion enlisting in the NF and a 4-percentage-point increase in the proportion enlisting in the AECF. This is an interesting result when combined with the results pertaining to age. In other words, younger recruits are more likely to enlist in the NF, whereas recruits with AASs, who tend to be older, are also more likely to enlist in the NF than those with just high school degrees when we control for age. However, the same is not true for those with Bachelor's degrees (BSs). In fact, if all recruits accessed with BSs, we predict reductions of 15 and 12 percentage points in the proportion enlisting in the AECF and NF, respectively.

Why are those with BSs so much less likely to enlist in the NF than other recruits, even after we control for age? The answer to this question is beyond the scope of this study. However, figure 11 shows the distribution by rating of recruits in this subsample by level of education. Although the AECF, NF, and SECF are the most common ratings

for HSDGs, this is not the case for those with BSs. In descending order, the most prevalent ratings for those with 4-year degrees are NF (24 percent), STG (almost 8 percent), CTI (almost 7 percent), HM (almost 7 percent), AECF (6 percent), MU (4 percent), and SECF (almost 4 percent). In fact, the STG, CTI, HM, and MU ratings account for 1 in 4 of these recruits, but only about 1 in 13 for those with just high school diplomas.

Figure 11. Most prevalent programs of entry by education, NF-qualified subpopulation



As we have speculated elsewhere [4], we believe that those with a BSs in large part choose the enlisted over the officer ranks because of their field of study and an inability to use their training optimally in the officer ranks. This is probably most pertinent to those with music degrees or foreign language degrees—hence the higher prevalence of MU and CTI Bachelor’s degree accessions. We cannot speculate as to why they also disproportionately enlist in the STG rating.

Note that the overall proportion of those with AASs entering the NF is lower than those with some college or HSDGs. Yet we estimate that when we hold other factors constant, they are more likely to enter the NF. We believe that this is because those with AASs are typically older than the average recruit (their average age in this subpopulation is

22.3 years versus the average of 18.9 for HSDGs), and the effect of age outweighs the effect of education in the aggregate.

We offer one possible explanation for differences in rating selection by some of the characteristics we have discussed. As we noted earlier, the NF program is unique in that it has recruiters targeted fairly exclusively for this program. If these recruits emphasize recruiting primarily from the best high schools within an NRD, we would expect to see the characteristics of recruits who enlist in the NF to be most closely associated with characteristics of high school seniors. In other words, NF recruits would be expected to be disproportionately young, in DEP a long period of time, to ship in the summer, and to have high school degrees only. That does not mean that NF-qualified recruits who are not recruited from the high school market are not considered for the NF, but it may be that these types of recruits have not had as much interaction with the NF recruiter, have not learned as much about the NF program, and so on.

### **Comparison across seasons within programs**

To allow a comparison within a rating but across seasons, we graph the predicted changes for both seasons for AECF in figure 12 and for the NF in figure 13.

For the AECF, age has little influence in either season, but increases in AFQT and days in DEP are consistently predicted to result in a decrease in the proportion enlisting in the AECF.

As we noted previously, African-Americans are much more likely to enlist in the AECF, regardless of season. In terms of education, the effects of some college and a Bachelor's degree are to reduce the proportion predicted to enlist in the AECF, regardless of season, whereas an Associate degree results in an increase in the predicted proportion enlisting in the AECF during the summer months only. The coefficients for some college, however, are the only statistically significant education effects for the AECF.

The unemployment rate has a slightly negative impact on the proportion enlisting the AECF during the summer months, and virtually no effect during FMAM.

Figure 12. Comparison between summer and FMAM - AECF

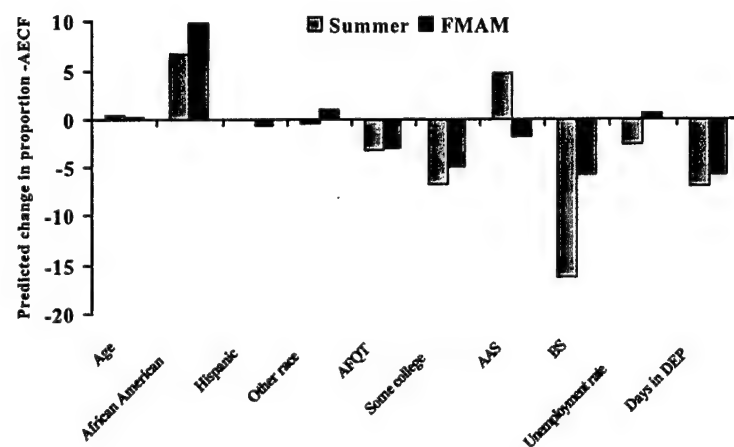
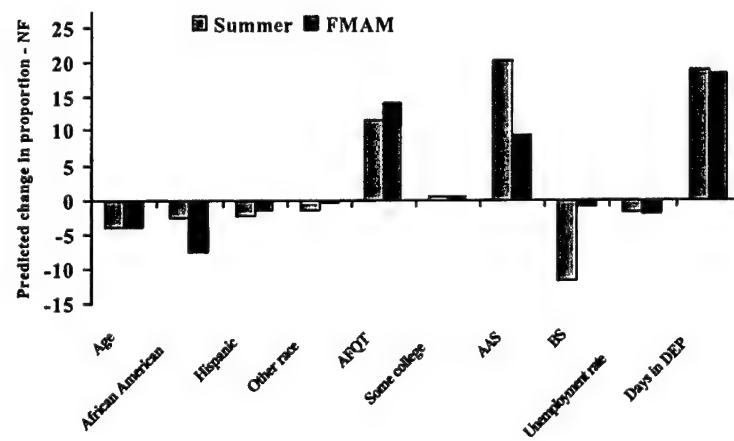


Figure 13. Comparison between summer and FMAM - NF



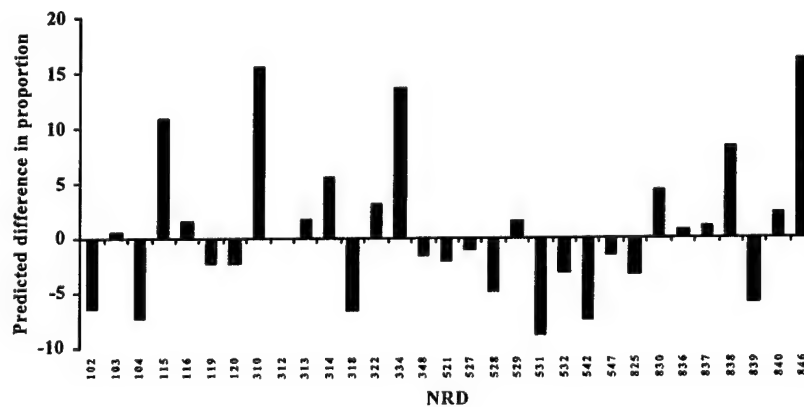
A higher AFQT and longer days in DEP have a positive effect on the probability of enlisting in the NF, regardless of season. This effect is especially significant during the summer when we consider that, on average, only 26 percent of summer shippers enlist in the NF, compared with 38 percent during FMAM. Hence, an 18-percentage-point increase in the predicted proportion enlisting in the NF during the summer represents a 70-percent increase. The same 18-percentage-point increase during FMAM represents an increase of just 50 percent.

Likewise, the predicted difference for an Associate degree is 20 percentage points during the summer, representing an 80-percent-higher probability of enlisting in the NF during the summer if all recruits had Associate degrees.

### Geographic effect

Because there is no standard reference group in terms of NRD, we calculate the difference in the predicted proportion enlisting in the NF relative to the mean proportion, for each NRD. These results are graphed in figure 14 for the summer months only. We illustrate the results for just this group and for one season only because it is sufficient to demonstrate a point.

Figure 14. Predicted NF differences in summer by NRD



In addition to controlling for personal characteristics, the logit estimates control for differences in state-level unemployment influences. Therefore, the predicted differences in the probability of enlisting in the NF by NRD are measuring some other type(s) of geographic variability. For instance, some factors that are geographically based that could have an impact on a person's selection of rating include post-service employment opportunities (e.g., whether a nuclear propulsion plant is nearby), preferences for serving on board submarines, preferences for longer enlistments, or the relative affordability of postsecondary education. These differences, however, could reflect variations in the ability of Navy recruiting personnel, the recruiter and classifier in particular, to "sell" particular programs.

Regardless of the reasons, we note that the difference in the predicted probability of enlisting in the NF between the NRD with the highest probability, NRD 846 (San Antonio), and the one with the lowest, NRD 531 (Dallas), is almost 25 percentage points. Again, to put this into perspective, we predict that if all NF-qualified recruits who shipped in the summer were recruited from NRD 846, the proportion enlisting in the NF would be more than twice that if all recruits came from NRD 531.

In our discussion with CNRC personnel regarding these results, it was noted that, unlike other ratings, NF goals vary by NRD. This is done to ensure a fairly equitable geographic representation of Sailors in the NF. One way to have an equitable geographic representation is to set the proportion who enlist in the NF by NRD to be roughly equivalent to the total proportion of all accessions from that NRD. In other words, if 5 percent of all accessions come from a particular NRD, we would expect that roughly 5 percent of all NF accessions would also be from that NRD. However, obtaining this goal may not be possible for NRDs that find it more difficult to recruit NF-qualified people. For those NRDs, a disproportionate number of NF-qualified recruits would have to enlist in the NF to ensure an equitable distribution.<sup>30</sup>

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30. Suppose two NRDs each represent 5 percent of total accessions and the first can recruit only 500 NF-qualified people but the second can recruit 1,000. To ensure equal numbers of recruits in the NF from the two NRDs, the proportion of NF-qualified recruits enlisting in the NF from the first NRD would have to be double that for the second NRD.

It is beyond the scope of this study to analyze NRD-specific NF goals. However, based on our logit estimates, and the Navy's NF NRD goals, we wanted to determine what the geographic representation in the NF program was for FY02. Table 3 shows the percentage of all recruits for the two extreme NRDs, 531 and 846, as well as the percentage of all NF accessions from these NRDs, and the percentage of NF-qualified recruits who came from these NRDs.

Table 3. Distribution of FY02 accessions from NRDs 310 and 531

NRD	Percentage of all accessions	Percentage of all NF accessions	Percentage of all NF-qualified accessions
531	3.5	4.0	3.9
846	4.0	3.4	2.6

Although we predict that NF-qualified recruits from NRD 846 have a much higher probability of enlisting in the NF (during the summer months) than an average recruit, we can see that, overall, the proportion of NF recruits from NRD 846 (3.4 percent) is less than the proportion of all recruits from that NRD (4.0 percent). Further, the percentage of all NF-qualified accessions is 2.6 percent. Conversely, NRD 531 represents more NF accessions, as well as having a disproportionate amount of NF-qualified accessions. Thus, as we illustrated above, given their numbers of NF-qualified accessions, NRD 846 must ensure that a higher proportion enlist in the NF, and NRD 531 must have a lower proportion than the average NRD enlist in the NF. Ensuring that an even higher proportion of NF-qualified accessions from NRD 846 enlist in the NF so that geographic parity is obtained may not be possible given current incentives. Certainly, there are tradeoffs in term of costs and benefits of ensuring such parity, and it is not certain how much of the total current NF EB budget is necessary to address the geographic representation goal.

Though we do not illustrate it specifically here, we also predict a large variation in the proportion enlisting in the AECF by NRD. For instance, for summer accessions, we predict as few as 11 percent of recruits enlisting in the AECF if all recruits enlisted came from NRD

310, 314, or 825, up to 29 percent if all recruits enlisted in NRD 840. Clearly, the effect of restrictions on the NF goal will have implications for the AECEF. For instance, NRDs that must enlist substantially more into the NF may also need to enlist disproportionately fewer in the AECEF. However, we submit that there is more to NRD differences than what is simply created by NF goals.

In summary, differences in rating selection by personal characteristics and geography may be the result of both recruit preferences and the Navy's and/or particular NRD's overall recruiting strategies and goals for the various programs. However, we suggest that understanding the impact of each on both preferences and Navy procedures would be useful in determining whether these differences are the result of other, more cost-effective methods to channel recruits into various ratings, or the result of systematic biases against recruits with certain characteristics.



## Summary and recommendations

Though we have not been able to offer specific estimates of the effect that changes in EBs have on enlistments in related ratings, our research has provided some valuable insight into incentives and the assignment process. Below, we summarize these findings and offer recommendations, differentiating them by whether they (a) are data issues that prohibit unbiased estimates or (b) are phenomena that do not necessarily prohibit unbiased estimates of the effects of EBs, but warrant further study.

### Estimation issues and recommendation

The most important finding is that we are not able to identify the range of ratings, ship dates, and incentives that each recruit is offered by the classifier, nor do we know precisely all of the factors that determine the set of offerings, which may vary by date, NRD, classifier, and recruit characteristics. As a result, we cannot determine whether the existence of a relationship between enlistments and incentives is the direct result of incentives or the result of a constellation of factors that simultaneously determine rating and ship date selection.

Other findings, which also complicate the estimation process, include:

- Incentives for ratings that have fairly comparable recruit requirements are highly correlated, making it impossible to disentangle the effects of each on rating selection.
- Incentives are not exogenous to rating choice. Instead, both seem to be dependent, at least to some extent, on goals.
- We cannot be certain that rating is the primary preference for each recruit. Depending on personal preferences, some may select ship month or incentive first, with rating simply being a by-product of their primary choice.

Further, some personal characteristics affect qualifications, personal preferences, and/or the set of offers made by the classifier, but we are not able to differentiate the role that they play in each. The following is what we have found concerning personal characteristics:

- African-Americans and older recruits who are otherwise NF-qualified are less likely to enlist in the NF.
- AFQT, an Associate degree, and days in DEP are all associated with a higher probability of enlisting in the NF.
- AFQT and days in DEP have an opposite, but smaller, effect on the probability of enlisting in the AECF versus the NF.
- Contrary to the probability of enlisting in the NF, African-Americans are more likely than all other races to enlist in the AECF.
- While NF-goals vary by NRD, we find larger geographic differences in the probability of enlisting in both the NF and the AECF than can be attributed to goals alone. Some differences may be due to such factors as geographic differences in preferences, or in NRD-specific policies.

Ultimately, we do not know whether differences in rating selection by personal characteristics and NRD reflect personal choice or some function of the classification process that differentiates offers by personal characteristics.

The method by which goals, incentives, and procedures for offering ratings are established is extremely complicated, with tradeoffs required in obtaining various outcomes. We believe that much more needs to be known about recruit preferences and the current methods used to set incentives and classify recruits, as well as the costs and benefits of these methods—not just from a recruiting perspective, but from an all-Navy perspective.

More fundamentally, it remains to be shown whether incentives actually have a skill or season channeling effect. No recent study has been able to conclude that incentives in the Navy serve any of these functions, and all existing studies have been subject to the same data limitations that we have outlined. While incentives may serve other purposes, such as reducing attrition or increasing retention, we think

that understanding their role in the recruiting process is paramount. Therefore, we recommend that the Navy conduct experiments to understand the roles that incentives, personal preferences, and the classification process play in the ultimate selection of rating and ship date. A companion CNA research document offers detailed recommendations for the types of experiments needed [3].

In order to assist any future research on the role of incentives, as well as to generally better understand and monitor the classification process, we also recommend that CNRC begin to formally document the complete set of ratings, ship dates, and incentives that are offered each recruit.

## Other findings and recommendations

In summary, these are our other findings:

- About 6 percent of FY00 and FY02 accessions who were promised an EB were promised the wrong level of EB. In most cases, the promised amount was too large; these errors totaled about \$2.75 million in FY02.
- Recruits who change either their original rating, ship date, or both are disproportionately offered the wrong EB. We do not know whether the erroneous EB offer was the reason that the DEPer made the switch. If so, these errors may serve to channel recruits. However, they may jeopardize the enlistment contract because they are contrary to policy.
- Recruits who ultimately ship in the high-tech ratings switch either rating or ship date at much higher rates than other recruits, sometimes as high as 50 percent. And while not as prevalent, still a fairly large proportion—about 20 percent of all recruits—switch either their rating or their ship date.
- Almost 13 percent of all FY02 accessions required moral waivers. Only five ratings accessed more than 20 percent of recruits with moral waivers, three of which were in the aviation field. In fact, one in four recruits in the Avionics field, the fifth most prevalent accession program, required a moral waiver.

First, we recommend that Navy recruiting reduce the errors in EB awards because they could potentially jeopardize the enlistment contract. It is our understanding that CNRC is considering options—based on our findings—to simplify the identification of the correct incentive, thereby reducing these errors.

Second, we recommend that the Navy determine whether the relatively large number of recruits with past legal, drug, or alcohol involvement in numerous aviation ratings poses any particular risk, increased attrition, and so on.

Finally, we do not have data pertaining to why so many DEPers switch, or what negotiations ensued to entice a DEPer to accept a less than optimal choice that they were subsequently willing to change, but we believe that it is important to understand this component of rating selection because it affects such a significant number of all recruits, and almost half of all high-quality recruits. Experiments like those outlined in [3] could serve to help understand this phenomenon.

If it is found that incentives serve to either expand the market or channel recruits into particular ratings or ship dates, our research here and in [4] has led us to conclude that it would be beneficial to the Navy to reevaluate its current policies concerning incentives and the classification system, particularly in terms of the ultimate goals of these processes. Such an evaluation is necessary to develop a more coordinated and integrated set of policies. In the following subsection, we outline some of the most important components of each that we believe need to be addressed.

## **Future research**

### **Market expansion and channeling**

As we noted earlier, incentives have traditionally been viewed as serving four main functions: market expansion, skill channeling, season channeling, and lengthening enlistments. Even within these basic functions, there are numerous tradeoffs.

For instance, not all market expansion efforts are comparable in scope or target market. During some periods, the Navy has had to increase the percentage of non-HSDGs (NHSDGs), especially when unemployment is very low. Expansion in this market requires no additional incentives, since the supply of these nongraduates typically far exceeds the Navy's demand. Further, the Navy does not allow NHSDGs to receive enlistment incentives.

The Navy has also tried to expand the recruitment of those with some college experience. The EB college kicker was created as an incentive targeted at recruits from this market. And, recently, the Navy has decided to increase the loan cap and budget for the College Loan Repayment Program (LRP) incentive [4].

In other words, all incentives are not equally desirable, or applicable, across the full range of recruit characteristics. Thus, the basic attributes of incentives should vary depending on the Navy's target markets. However, if a number of incentives exist for the same market, which are the most cost-effective? For instance, as we have argued in [4], unless recruits with college experience who have loans have lower attrition, higher retention, or higher productivity than recruits with the same level of college experience who do *not* have loans, the LRP may not be as cost-effective as the EB kicker for college credit. An analysis of this tradeoff would require research into the entire first-term costs and benefits of recruits with some college experience.

Further, should incentives vary by rating, or by broad characteristics? In other words, should incentives be composed of amounts that are tied to both ship month and certain requirements, such as security clearance, length of obligated service, high AFQT, and submarine duty? Certainly, this would simplify the process of setting EBs, as well as the identification of the right level for classifiers. But it also presumes that the level of difficulty of filling certain quotas is a result of some broad characteristic of the rating, rather than specifics.

We also reiterate our recommendation to rethink the policy of setting quotas for EBs that are significantly lower than the goal for that rating. If EBs are shown to have a skill-channeling effect, the current policy of restricting offers jeopardizes the ability to meet goal.

## Attrition and retention effects

In addition to those outlined above, incentives could potentially serve other functions. For instance, a recent CNA paper [8] concluded that, in some cases, EBs serve to lower attrition for those enlisting in 5- or 6-year programs. The findings indicate that some of the reduction occurs before the person receives the bonus, perhaps lowering boot camp attrition in anticipation of receiving a large sum at a later date. However, EBs also serve to lower posttraining attrition. Put another way, EBs increase the amount of time that a recruit is on active duty, both before and after training.

Another recent CNA study [9] found a positive relationship between the level of military compensation and the proportion of eligible personnel who reenlist. This study looked at compensation at the first reenlistment point, with the Selective Reenlistment Bonus (SRB) representing a fairly large proportion of compensation for Sailors at that decision point. Further, the study concluded that, even though Sailors in high-tech ratings earn more than those in less technical ratings, a greater military compensation differential was necessary to increase reenlistments and help alleviate manning shortfalls in the high-tech ratings.

Although this specific issue was not addressed in that research, perhaps the findings from [9] are relevant to the effects of EBs on first-term reenlistments. In other words, it may be that relatively larger EBs in high-tech ratings, which serve to enhance the military compensation differential between high-tech and low-tech ratings in the first term, also affect a Sailor's reenlistment decision, or the decision to extend service.

The point of noting these findings is that considerations of changes to the current incentive structure should include the impact that they have on all first-term Sailors—not just on recruits or potential recruits. In determining whether to reduce or eliminate offerings, we suggest that the Navy consider the *total* first-term costs and benefits of such a change.

## Other incentive considerations

In addition to the issues outlined above, a number of other considerations of how to structure incentives merit discussion. For instance, all incentives are ultimately linked to ratings. Typically, only those ratings that are relatively hard to fill—in the short or the long term—are eligible for incentives, and the policy governing incentives requires forfeiting the incentive if the person does not complete training in the rating in which he or she shipped or to which he or she was reclassified during boot camp. This policy makes sense if the most important component of incentives is skill channeling, and not simply expanding the market to access higher quality recruits, regardless of their ultimate rating. But instead of total forfeiture of enlistment incentive if the person fails his or her training, is there a breakeven “second chance” EB amount for which it is worth it to the Navy to ensure that the Sailor either (a) does not attrite from the Navy because of the loss of all of the incentive or (b) does not refuse to enlist in more difficult ratings in the first place because of the higher probability of academic attrition from more technical programs? The answer to this depends on what the relative costs are, in terms of recruiting and boot camp training for a replacement, versus the cost of incentives necessary to ensure that the person does not attrite.

This discussion leads to another question: Should incentives be tied exclusively to rating, or would the Navy also benefit by tying some portion of incentives to recruit attributes? In fact, the Navy already has incentives based on one recruit characteristic—college experience. There are three separate incentives for this population: advanced paygrade, EB kicker for college credit, and the Loan Repayment Program (LRP). However, the effectiveness of these incentives in expanding the market is not understood, and none is intended to channel recruits.

We also suggest that the policy governing the timing of incentive payments should be examined. As we discussed, incentives may play a role in reducing first-term attrition and/or increasing the reenlistment rate. At present, payments are made at the end of initial pipeline training, which is consistent with a philosophy that EBs should primarily serve to channel recruits into particular ratings and ensure

that they complete training. Reference [8], the study cited earlier, showed that EBs could entice more Sailors to complete boot camp, only to attrite sometime later but before the end of their obligated service. In this case, is an incentive beneficial to the Navy if it serves only to keep a Sailor on active duty longer, and the vast majority of that time is spent in training?

The Navy currently has different payment schedules for different incentives. For instance, recruits in the NF and those who receive the kicker for college credit receive multiple payments, with the first payment occurring on completion of boot camp. And LRP recipients receive graduated payments for their loans, with one-third of the total debt paid annually, starting on the first anniversary of the Sailor entering active duty. Are there significant differences in attrition behavior that can be attributed to these various payment schemes?

Another component of incentives concerns the date on which to base the award level. Currently, the day the recruit first DEPs determines the award in effect for the date and the rating in which he or she ultimately ships. However, we have also seen that a large number of DEPers, particularly those who end up in the technical fields, change either ship date or rating, or both. Those who do switch are disproportionately offered EBs that are higher than the bonuses they would have received had they enlisted in that combination of rating and ship date on the day they first DEPed. It is not clear whether classifiers are able to encourage DEPers to make such changes based in large part on the higher, but erroneous, incentives. If such changes benefit the Navy, and DEPers would not make the change without the higher offer, is it worth it to the Navy to pay higher sums? The question, then, is whether it is better to base award levels on first DEP date, which helps to achieve a new contract objective, or on ultimate ship date and rating, which helps to achieve shipping goals.

The last component of incentives that we believe warrants consideration is whether incentives should be publicized and made known to recruits before they enter MEPS. Currently, EB messages are not distributed to recruiters, nor are they published on the recruiting web site. Recruiters may have a general idea of the magnitude of incentives in various ratings, particularly the NF and other 6YO programs;



however, because the recruiter's role is *not* to sell a recruit on a particular rating but on the Navy in general, the Navy intentionally limits the distribution of EB messages.

A potential recruit can learn the basics about various incentives by visiting the recruiting web site. However, particulars concerning the requirements for incentives, such as the requisite 12-month extension for incentives for most recruits, the forfeiture of incentives if training is not successfully completed, or the timing of payments of various incentives, is not provided. How much of this information is provided by recruiters or classifiers is unknown, but it is certainly not consistent across the nation or over time.

If a recruit enters MEPS with very little knowledge about various types of incentives and has a limited time to discuss options with the classifier, it is not certain how much channeling effect incentives can really have.

## The classification process

We turn now to the other critical component of the selection of ultimate rating and ship date—the classification process. Apart from the necessity of understanding what is currently done in practice, we offer some basic functions and consequences of the classification process that we feel should be considered. In particular, when should the Navy restrict recruit's options in order to meet the Navy's needs? Should an NF-qualified recruit's first offer be to ship this month as a Gendet, because the Gendet goal has not been met? Or does the cost to the Navy to find another highly qualified recruit to fill next month's NF goal outweigh the benefit of offering that option to today's recruit? For every high-quality recruit who does not enlist in a high-tech rating, recruiters must expand the market to find one more qualified recruit who will enlist.

Further, what is the cost of not allowing recruits to pick an option that is best suited to their preferences and abilities, in terms of higher attrition or lower retention from such a poor match, and does the cost outweigh the Navy's more immediate recruiting benefits? A recent CNA study found that Sailors who are forced to take billets involuntarily have lower retention and continuation rates [10]. Does

the same apply to those who are involuntarily assigned a career, something that has the potential to have a much longer negative impact on a recruit's quality of life and satisfaction with the Navy?

Finally, is restricting the set of choices to those ratings with the most difficulty in meeting goal all that is necessary to meet a goal? If so, EBs may not be necessary to channel recruits into ratings or ship months. But, again, what is the cost of this restriction? Or do potential recruits refuse to enlist when faced with such limited options?

### **Cross-Service effects**

Our final recommendation pertains to a question that is larger than just the cross-rating effects of incentives within the Navy. That is, what are the cross-service effects of incentives within the Department of Defense? Although the Navy has found it necessary to increase the funding for EBs more than 500 percent in the past 5 years, it still spends significantly less per NPS accession than either the Army or the Air Force, both of which have also significantly increased their budgets for incentives during the recent recruiting crisis.

Therefore, we recommend that the DoD study incentives from an all-Service perspective. We believe it is important for DoD to understand how much of the total Navy incentive budget is necessary for civilian-sector competition and how much for inter-Service competition. In particular, do current incentives actually serve three purposes:

1. To entice young people to join the military, regardless of the Service?
2. To channel them to a particular Service?
3. To channel them to a particular rating and ship month within that Service?

If so, how much of the increase in DoD's recruiting budget in the past 5 years can be attributed to the second purpose only, and, if this is a significant sum, are there more cost-effective, and perhaps cooperative, recruiting methods for DoD?

## Appendix A: Correlation coefficients

Table 4. Correlation coefficients of NF, AECF, and SECF enlistment incentives

	NF EB	AECF EB	SECF EB	NF NCF	AECF NCF	SECF NCF	NF EB in Combo	AECF EB in Combo	SECF EB in Combo	NF NCF in Combo	AECF NCF in Combo
AECF EB	.90										
SECF EB	.94	.94									
NF NCF	.62	.42	.45								
AECF NCF	.38	.24	.20	.72							
SECF NCF	.40	.26	.22	.76	.95						
NF EB in Combo	.84	.82	.85	.58	.37	.40					
AECF EB in Combo	.60	.80	.67	.25	.20	.21	.67				
SECF EB in Combo	.64	.80	.71	.28	.25	.27	.72	.98			
NF NCF in Combo	.64	.63	.64	.58	.38	.41	.87	.54	.58		
AECF NCF in Combo	.40	.48	.40	.36	.49	.53	.49	.73	.78	.47	
SECF NCF in Combo	.40	.48	.40	.36	.49	.53	.49	.73	.78	.47	1.0

Table 5. Correlation across EBs

	NF	AN/SN	FN	IT	AD	AM	AO	MM	MS	OS
AN/SN	.68									
FN	.53	.89								
IT	.76	.71	.59							
AD	.68	.62	.48	.72						
AM	.61	.61	.33	.64	.66					
AO	.78	.70	.49	.74	.88	.83				
MM	.78	.79	.57	.79	.78	.86	.95			
MS	.58	.56	.28	.59	.67	.89	.81	.84		
OS	.52	.76	.73	.62	.48	.30	.48	.59	.45	
YN	.61	.70	.59	.59	.71	.47	.75	.75	.65	.74

## Appendix B: Logit estimates

Table 6. Logit estimates for NF-qualified subpopulation

Variable	June–August		February–May	
	NF	AECF	NF	AECF
Personal characteristics				
AFQT	.15 <sup>a</sup>	-.04 <sup>a</sup>	.14 <sup>a</sup>	-.05 <sup>a</sup>
Age	-.19 <sup>a</sup>	-.02	-.14 <sup>a</sup>	-.02
Race				
African-American	-.26	.46 <sup>a</sup>	-.55 <sup>b</sup>	.88 <sup>a</sup>
Hispanic	-.25	.08	-.14	-.07
Other	-.18	-.02	-.07	.22
Education				
Some college	.05	-.57 <sup>b</sup>	.05	-.45 <sup>b</sup>
Associate degree	1.50 <sup>b</sup>	.26	.59	-.36
Bachelor's degree	-1.10	-2.00	-.05	-.50
DEP days (in 100s)	1.12 <sup>a</sup>	-.376 <sup>a</sup>	1.41 <sup>a</sup>	-.79 <sup>a</sup>
FY00	.14	1.35 <sup>a</sup>	.49 <sup>a</sup>	1.73 <sup>a</sup>
FY01	-.11	1.20 <sup>a</sup>	.57 <sup>a</sup>	1.42 <sup>a</sup>
NRDs <sup>c</sup>				
102	-.80 <sup>b</sup>	-.09	-.82	-1.10 <sup>b</sup>
103	-.20	-.19	.67	-1.11 <sup>b</sup>
104	-.87	-.31	-.50	-1.03 <sup>b</sup>
115	.58	-.68	.54	-.88 <sup>b</sup>
116	-.12	-.37	.02	-1.49 <sup>a</sup>
119	-.44	-.06	-.12	-.43
120	-.44	-.01	.95 <sup>a</sup>	-1.57 <sup>a</sup>
310	.90 <sup>b</sup>	-.79	-.08	-.30
312	-.21	-.51	-.55	-.07
313	-.10	-.54	.19	-.82 <sup>b</sup>
314	.19	-.85 <sup>b</sup>	1.00 <sup>a</sup>	-1.28 <sup>a</sup>
318	-.81 <sup>b</sup>	-.08	.21	-.64
334	.77	-.08	.41	-.40

Table 6. Logit estimates for NF-qualified subpopulation (continued)

348	-.38	-.50	.09	-.33
521	-.42	.03	-.11	-.79 <sup>b</sup>
527	-.33	.35	-.81 <sup>b</sup>	-.66
528	-.65	-.55	.33	-1.37 <sup>b</sup>
529	-.12	-.66	.08	-.23
531	-1.02 <sup>b</sup>	.34	.05	-.26
532	-.50	.30	-.09	-.10
542	-.90 <sup>b</sup>	-.53	.22	-.48
547	-.36	-.20	.99 <sup>a</sup>	-.83
825	-.52	-.83 <sup>b</sup>	-.26	-.74
830	.10	-.25	-.15	-.68
836	-.18	.09	.33	-.39
837	-.17	.12	-.49	-.02
838	.39	-.30	.96 <sup>a</sup>	-1.54 <sup>a</sup>
839	-.75 <sup>b</sup>	.14	-.43	-.12
840	-.07	.52	.53	-.90 <sup>b</sup>
846	.95 <sup>b</sup>	-.16	.84 <sup>b</sup>	-.33
Unemployment	-.13	-.18 <sup>a</sup>	-.11	.07
Intercept	-11.98 <sup>a</sup>	2.93 <sup>a</sup>	-11.01	2.40
Pseudo R <sup>2</sup>	.34	.11	.29	.15

a. Significant at the .01 level

b. Significant at the .05 level

c. Omitted category is NRD 322. Statistical significance is relative to this omitted NRD only.

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